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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

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- 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;
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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).

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Where Does the Soullessness of the Ruling Elites Lead?

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Abstract. On April 21, 2021, President V.V. Putin once again addressed the Federal Assembly of the Russian Federation and outlined the country's key upcoming development areas. Presidential Address was mostly social and aimed at solving domestic problems: comprehensive support for population and business in the "post-covid" period, restoration of the economy and social sphere's normal functioning, as well as the ability of the Government to maintain health of citizens and improve the demographic situation. The President touched upon many important issues that were demanded by a wide range of Russian society, gave instructions to the Government of the Russian Federation and regional authorities, and announced specific measures to support people in difficult life situations. Meanwhile, the issues of Russia's foreign policy and its positioning within the framework of international relations remained basically outside this Presidential Address. The President only hinted that "those behind provocations that threaten the core interests of our security will regret what they have done in a way they have not regretted anything for a long time", "we ourselves will determine in each specific case where the red line

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will be drawn with regard to Russia". However, as many experts note, after the victory of J. Biden in the US presidential election, there was the beginning of the culmination of the struggle between global forces for the return of dominant positions in the world that they have gradually lost over the past decades, for a unipolar or multipolar form of the future world order, prospects for the transition of world civilization from modernism to postmodernism. In these conditions, the issues related to Russia's civilizational self-determination and awareness of a kind of the state we are building, reasons that prevent us from effectively implementing the welfare state principles in the country, many of which were embodied in the amendments to the Constitution of the Russian Federation in July 2020, become more relevant than ever.

Key words: ruling elites, geopolitical relations, soullessness, state, postmodernism.

Considering the concept "soullessness" in relation to the effectiveness of public administration, first of all, it is necessary to outline the subject field of this category. We would like to note that spirituality or soullessness is a property of a person, and not a feature of any social group. In this sense, this concept is closer to psychology, rather than sociology, and, therefore, analyzing the degree of spirituality / soullessness of the ruling elites, their motives and actions, we are talking about certain personal qualities that, nevertheless, have complex (social, economic, cultural-historical, etc.) consequences, including a wide spread of soullessness – from certain social groups (in particular, the ruling elites) into the general population.

"A soulless society – as some experts note – is a society with no high ideas, no dreams, no hopes for the future, a society with illuminated high moral ideals and values. In a soulless society, culture, cinema, theaters, literature are primitive, education is disfigured, but crime, aggression, lawlessness, and violence flourish. This is a society with only material values rule, and the demands of the human spirit and soul are completely ignored. **Soullessness is an environment where the ruling elites, who do not possess moral and spiritual qualities, feel themselves great and comfortable, guided only by their immorality"**[4].

"Spirituality is a morality unfolded in time. In motion. But if morality is a social concept, **then spirituality is, first of all, an entity belonging to an individual"**[1].

"Spirituality is a property of a human soul, **consisting in the predominance of spiritual, moral, and intellectual interests over material ones"**[2].

"It seems to us that the process of spiritual and ethical development of a person can be defined **as the process of formation of his personality"**[3].

Thus, in the context of issues of the effectiveness of public administration, soullessness can be interpreted as a personal feature of individual members of the ruling elites who have lost their sense of moral responsibility to society, to the vocation to protect and defend the national interests of the country in connection with the priority of personal, selfish interests.

[1] Buzmakova T.I., Kirilina T.Yu. Spirituality and morality of Russian youth in the sociological dimension. *Social Policy and Sociology*, 2013, vol. 1, no. 3 (94), pp. 169–183.

[2] Ozhegov S.I., Shvedova N.Yu. *Dictionary of the Russian Language*. Moscow, 1992.

[3] Vinogradova I.E. Morality. Moral. Spirituality. Looking for meaning. *Vestnik of Kostroma State University,* no. 3, 2006.

[4] Mamychenko A.V. *Replacement of Destructive Elites. New People of the Creative State. Professional Parliament*. Book 2. P. 90.

It is also important to note that soullessness is an integral part of the "consumer society" as a stage of capitalism, where the modern world and Russia stand at. It is also a vivid attribute of the postmodern era, where the global community is moving to under the pressure of global elites. In this sense, soullessness should be analyzed from a geopolitical point of view – as an aspect of a purposeful hybrid policy that has been implemented by members of global elites for several centuries. The process of forming a liberal ideology "dates back to the Middle Ages, reaches maturity in Modern times with the emergence of capitalist society, and reaches its final stage today"[5].

It is the geopolitical aspect of the Russian elites' soullessness that makes us pay attention to this problem. Throughout the centuries-old history, Russia has repeatedly faced the lack of spirituality among the elites that each time led to the destruction of statehood with the direct participation of foreign countries interested in it.

✓ In the "Time of Troubles" (1598–1613), soullessness of the ruling elites, aggravated by the Swedish-Polish intervention, led to the onset of a period of "anarchy, discord in all layers of society, famine, and general misfortunes"[6], when the holders of the royal throne in Russia alternately replaced each other (B. Godunov, False Dmitry I, V. Shuisky, False Dmitry II) until the first representative of the Romanov dynasty (Mikhail Romanov) came to power.

✓ During the collapse of the Russian Empire (early 20th century), it was about the **inability** of the elites to cope with a complex of internal and external contradictions, largely due to heavy economic, social, political, and military losses during participation in the First World War, which led to the First Russian Revolution of 1905, the Great October Socialist Revolution of 1917, and, ultimately, to a total change of the ruling regime.

> "World leaders, heads of major corporations – Big Tech, Big Data, Big Finance, etc. – have united and mobilized to defeat their opponents – Trump, Putin, Xi Jinping, Erdogan, Ayatollah Khomenei, and others. The beginning was snatching a victory from Trump using new technologies – through "capturing the imagination", introducing Internet censorship and mail-in voting fraud. **Biden's arrival in the White House means that the globalists are moving on to further actions. This should affect all areas of life – the globalists are returning to the place where they had been stopped by Trump and the other poles of the rising multi-polarity..."**[7].

✓ The collapse of the Soviet Union (late 1980s–early 1990s) was the result of a **deliberate betrayal** of the country's national interests by the ruling elites for their own personal goals. With an active participation of the United States, with which the USSR was in a state of the "Cold War", the statehood collapsed.

As we see, in different historical periods, the ruling elites' soullessness acquired different forms, but it was always there, accompanied by foreign intervention and ended with the collapse of the state.

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[5] Dugin A. Manifesto of the Great Awakening. *Zavtra,* March 7, 2021. Available at: https://zavtra.ru/blogs/manifest_velikogo_probuzhdeniya

[6] The Time of Troubles in Russia in 1598–1613. Tsars and their deeds. *Историиземли.рф.* October 23, 2020. Available at: https://историиземли-рф.turbopages.org/xn--e1adcaacuhnujm.xn--p1ai/s/sample-page?

[7] Dugin A. Manifesto of the Great Awakening. *Zavtra.* March 7, 2021. Available at: https://zavtra.ru/blogs/manifest_velikogo_probuzhdeniya

Recent events, taking place in the geopolitical arena, force us to draw historical parallels. According to experts, since the announcement of the course for the "Great Reset"[8] at the Davos Forum in May 2020, global, supranational[9] elites have actually announced their aggressive revenge on the events that have become increasingly obvious throughout the 21st century: formation of a multipolar world, strengthening of international positions of Russia, China, exit from the Western influence of Turkey, Iran, Pakistan, Saudi Arabia, etc., Trump's win in the US presidential election in 2016.

The starting point for the practical implementation of the "Great Reset" policy can be considered the victory of J. Biden in the US presidential election in 2020. The subsequent escalation of the conflict in Donbas and, in general, Russian-American relations (including the bilateral expulsion of diplomats, harsh public statements by the American president against Vladimir Putin, bilateral economic sanctions, large-scale troop movements to the site of potential hostilities) are not accidental. They are a direct consequence of the purposeful policy of global liberal elites to strengthen their positions in the world.

Therefore, their goal is not just Russia, but world domination in all spheres of life: politics, economy, business, culture, information and value field, etc. The purpose of the global elites is total control over humanity as such, regardless of its national, religious or any other affiliation; the transformation of a "reasonable person" into a "service person" ***(Insert 1)*****.**

For this purpose, they take specific steps to erase the boundaries of national, religious, gender, and socio-cultural identity. Depopulation values are intensively cultivated (for example, the priority of material well-being as the purpose and meaning of life success; as a result, the birth of several children becomes burdensome, which creates conditions for minimizing a number of children in a family; or permissiveness, which leads to disregard for moral and ethical norms that ultimately cause illegal behavior, same-sex marriage, spread of specific negative social phenomena, such as alcoholism, drug addiction, etc.). The world community is artificially brought to a global existential crisis, so that society "loses a clear idea of what it wants", and, consequently, the global elites have an opportunity to dictate their own rules to humanity (*Insert 2*).

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[8] The "Great Reset" idea was first mentioned in K. Schwab and Charles, Prince of Wales report at the World Economic Forum in Davos (May 2020).

[9] "The presence of supranational elites and their structures is an immanent feature of capitalism as a system. The bottom line is that, in economic terms, capitalism is a single whole without borders, and it is the sum of divided states in political terms. **The big bourgeoisie, especially the financial bourgeoisie, always has interests outside their countries, and their realization requires breaking political boundaries. Systematically, this is possible only if there is a structure that has a closed supranational nature and affects states in a closed mode…** In the early 21st century, with the end of the Napoleonic wars, the supranational structures of the West were closely intertwined with each other, and they formed an unprecedented global network – not just international one (unions of states were international)". (Source: Fursov A.I. To survive, we need a more sophisticated elite. Kultura. November 10, 2020. Available at: https://portal-kultura.ru/articles/country/329883-istorik-andrey-fursov-chtoby-vyzhit-nam-nuzhna-bolee-slozhnaya-elita/).

Insert 1

Materials of the round table of the Ministry of Defense of the Russian Federation "Psychological defense. War for History – War for Survival" August 25, 2020

... the pre-war is going on today and we are not winning it. This pre-stage is the preparation of the second stage of this war-direct enslavement. Today, the situation of colonization and enslavement has been replaced by technological enslavement. You used to do it with military force, but today you do it technologically. A simple example is the Internet. What is the Internet? This is a digital gulag, in its purest form. Only if earlier people were seized, placed behind barbed wire and guarded, then all these people came here themselves. They themselves came to this digital gulag and live very comfortably there. They explained to the person that everything is written in Wikipedia, there is no need to learn, everything is on the Internet, and then we build a society of people whose heads can be cut off through a simple thing – by cutting off the switch. And that's all, there is no more question.

The second thing is cognitive. What is a color revolution? This is **the use of cognitive technologies to control the mass consciousness.** What should be done first? Fooling. Simplification of the whole system to the Unified State Exam-education, so that you answer the questions, that is, to fool you to the maximum, then give you iPhones, and hang up the satellite. You can counteract this in a very simple way – a switch. One action, and then nothing works ...

Today, the system of basic moral principles is being scrapped, and alternative norms are being imposed. This is happening everywhere by destroying the traditional systems of family and marriage, reducing the authority of religion. Instead, these basic systems offer the absolutization of individual freedom: children are more important than parents, there are no authorities, respect for elders disappears, you can talk and call for anything on the Internet – from a terrorist attack to suicide, because this is an individual freedom.

Such absolutization of an individual freedom is used as a "sledgehammer" to destroy state sovereignty. And the sovereign state, in fact, is the only instrument, the institution that can ensure the rights of an individual and a personal freedom. **As a result, the organized civilized community is replaced by a set of easily managed individuals. In parallel, there is a reduction in the birth rate by introducing ideas into the mass consciousness that deny the natural continuation of life. This is the ideology of LGBT people, families without children, etc.**

The dream of the elites ruling the world has always been to bring out a certain subspecies of "service" people who would have limited self-awareness, less needs. Today, for the first time in the history of civilization, there is a technological possibility of bringing out such, let's call it, a "service" person.

Source: M.V. Kovalchuk's report at the round table of the Ministry of Defence "Psychological defense. War for History – War for Survival". August 25, 2020. Available at: https://ok.ru/mirovozren/topic/152400692997072

Mikhail V. Kovalchuk – RAS Corresponding Member, President of the Kurchatov Institute; physicist, specialist in X-ray diffraction analysis.

Insert 2

Existential crisis in the modern world

According to a report by the authors of the Edelman Trust Barometer study conducted in October – November 2019, **most of the world's population have lost faith in the benefits of capitalism, and they are afraid that Western democracy is losing its effectiveness.** The survey studied more than 34,000 people in 28 countries, and 56% agreed that capitalism does more harm than good in its current form.

More than half of respondents from such seemingly benevolent countries as France (69%), Italy (61%), Spain (60%), the Netherlands (59%), Ireland (57%), Germany (55%), Singapore (54%), and the United Kingdom (53%) expressed their disillusionment with modern capitalism. In Russia, 55% of respondents agree that capitalism does more harm than good. Among the studied countries, only Japan has less than half of pessimists (35%).

The authors of the study note that **pessimistic views on capitalism prevail among representatives of all ages and with any income level, and men and women share nearly the same pessimism (57% and 56%, respectively). The growth of general pessimism is accompanied by a decrease in confidence in the main social institutions.** 57% of the survey participants said that the authorities serve the interests of "a few", while only 30% believe that the government works in general interests.

The authors of the study believe that the reason for the decline in the level of trust is the growth of inequality and people's fear for their future. On average, only 47% believe that they and their families will live better in five years than now... In developed countries, however, barely one of three people is waiting for an improvement in their lives. In some of the most developed countries, the share of optimists is even lower: in Japan – 15%, in France – 19%.

Source: Most people in the world are disappointed with capitalism and their future. RBK. January 21, 2020. Available at: http://worldcrisis.ru/crisis/3526130

"In the modern world, the United States has only two major adversaries – China and Russia. At the same time, we cannot discuss Russia as a serious economic competitor to the United States. However, for Washington, the ideological confrontation with our country is very important. **Russia has become the "other" state that receives the most negative features from the American propaganda.** As for China, it is a serious economic competitor, but China is too far away and poorly known to the Americans for political opposition"[10].

"... China will continue to be an economic rival, Russia will remain an adversary, and Europe will be a more or less hidden competitor"[11].

Russia, along several other countries, is only an obstacle to the global elites in destroying Human identities and turning it into a "gray mass" of homogeneous plebs serving the interests of the "golden billion". However, the obstacle is perhaps the most dangerous, since Russia has the parity of nuclear weapons and represents the most real force opposing the establishment of a unipolar world. In this regard, in the public rhetoric of the United States, Russia is not an economic rival, but an ideological enemy.

Thus, the aggravation of international political relations, we have seen in recent years and months, is not just a struggle for the territories of Ukraine, not only a showdown between Russia and the United States, **but another (perhaps the culmination) stage of a centuries-old struggle for the future of the world, its multipolar or unipolar form of existence, the dominant system of values, which will later be adhered to by most and perhaps all of humanity.**

A logical question arises: what do the Russian elite and a general internal situation in the country have to do with the ambitions of the "collective West" to establish world domination and an ability of Russian diplomacy and the military-industrial complex to resist them? If the culminating phase of the historical process of clarifying relations in the international arena is unfolding today, then what does it have to do with numerous representatives of Russia's economic and political elites who pursue purely personal interests of material enrichment (as the experts, whose assessments we have given in previous articles, have repeatedly drawn attention to[12])?

"According to the media content analysis, 34 governors, including 19 active ones, were brought to criminal responsibility in 1996–2021.

In 2020, the Investigative Committee of Russia referred criminal cases to the courts against 466 high-ranking officials, including 130 mayors, 116 municipal and 10 regional deputies, 48 members of election commissions, 38 investigators of the Ministry of Internal Affairs and 17 of the Investigative Committee, 15 prosecutors and 7 judges... only 18% of the 8,000 convicted corrupt officials were sentenced to actual imprisonment, 35% – to conditional imprisonment, and 40% – to a fine"[13].

[10] Polonsky I. Who is the main adversary of the United States: China or Russia? *Military Review.* October 11, 2018. Available at: https://topwar.ru/148186-kto-glavnyj-vrag-ssha-kitaj-ili-rossija.html

[11] Opinion of the national security specialist, Prof. D. Yonchev (Source: US election results: Russia – adversary, China – rival, Europe – competitor. *Inosmi.info.* November 7, 2020. Available at: http://www.inosmi.info/itogi-vyborov-v-ssha-rossiya--vrag-kitay--sopernik-evropa--konkurent-bnr.html).

[12] See, for example:

Mikulski K.S. On the political economy foundations of modern Russian society. *Society and Economy,* 2017, no. 12, pp. 5–9; Korotaev S.A., Shkaratan O.I. Post-Soviet statehood and society. Part 3. The strengthening of statehood as social contract between society and authorities. *Social Sciences and Contemporary World*, 2018, no. 1, p. 70; Ilyin V.A., Morev M.V. What will Putin bequeath to his successor in 2024? *Economic and Social Changes: Facts, Trends, Forecast,* 2018, vol. 11, no. 1, pp. 9–31.

[13] Sukharenko A. Governor's springboard: from the chair to the bunk. *Nezavisimaya Gazeta.* March 23, 2021. Available at: https://www.ng.ru/kartblansh/2021-03-23/3_8109_kartblansh.html

The answer to this question leads us to the disclosure of the essence and modern specifics of soullessness among the ruling elites. Indeed, it is unlikely that at least one of the dozens of corrupt officials had the goal of weakening the economic potential of our country, hardly thought about national interests, historical confrontations, the future of the country, and even more so of humanity.

Just as in many broader and longer-term problems of Russia, such as "oligarchic capitalism", which led to extreme inequality, stalling of national projects, reform of science and education, growth of anxiety and uncertainty about the future among population[14], we should look for traces of the "fifth" and "sixth" columns.

"The sixth column includes the liberals in power, the oligarchs, and a significant, if not a main, part of the Russian elite, which, being formally loyal to the patriotic course of the President Putin, is organically connected with the West and is immensely burdened by this course...

A cunning plan of the sixth column is **to maintain ties with the West at all costs. It was clearly not Putin who was behind the plan, but Putin accepted it.** It could not have led to anything, and it did not. We lost 7 years, and our opponents gained them...

Since the sixth column actually won, the spiritual transformation of Russia did not begin. Ideology was put aside, technical issues were taken up, and control over political processes was in the hands of technocrats. The meanings were removed from the equation. Stagnation began, when primitive entertainment and corruption, which was rapidly growing out of boredom and lack of ideas, came to the fore"[15].

These phenomena of modern life did not arise as a result of a deliberate undermining of national interests, but as a result of their elementary disregard, inability or unwillingness of the ruling elites to see far-reaching consequences for the sovereignty and other national interests of the state behind their actions. Profit-making is the main element in the value system of capitalism, and no national interests can outweigh it for people who share, profess, and actively lobby for a liberal-capitalist value system.

Thomas Joseph Dunning (1799–1873; British trade unionist, publicist): "Capital is afraid of no profit or too little profit, just as nature is afraid of emptiness. But once there is sufficient profit available, capital becomes bold. Secure 10%, and capital agrees to every use; it becomes animated at 20%; it is positively ready to break its head at 50 %; **it tramples on all human laws at 100%; there is no crime it would not risk at 300%, even if it were on pain of the gallows"**[16].

The Russian elites feel themselves, and they actually are, a part of the global elites, because they have financial and family ties with them; they share and actively lobby their interests, lifestyle, integrate into international monopolies, thus "infecting" Russian society with soullessness and leading it along the capitalist path – from the stage of "consumer society" to the postmodern stage.

By blindly copying innovations that supposedly improve the efficiency of the organization of life, health, and education, they

[14] See:
Ilyin V.A. "Crony capitalism" – a source of social inequality in modern Russia. *Economic and Social Changes: Facts, Trends, Forecast,* 2017, vol. 10, no. 6, pp. 9–23; Ilyin V.A., Morev M.V. Nationally oriented rotation of the elites – the most important condition for the implementation of national projects. *Economic and Social Changes: Facts, Trends, Forecast,* 2019, vol. 12, no. 4, pp. 9–25; Ilyin V.A. What a Shame... *Economic and Social Changes: Facts, Trends, Forecast,* 2017, vol. 10, no. 2, pp. 9-21; Ilyin V.A., Morev M.V. Public administration efficiency in 2000–2018 in the assessments of the region's population. *Economic and Social Changes: Facts, Trends, Forecast*, 2019, vol. 12, no. 1, pp. 9-38.

[15] Dugin A. Geopolitics of Novorossiya 7 years later. *Official website of the Izborsky Club*. April 9, 2021. Available at: https://izborsk-club.ru/20918

[16] Dunning T.J. *Trade's Unions and Strikes: Their Philosophy And Intention.* London: Published by the author, and Sold by M. Harley, No 5, Raquet court Fleet street, E.C., 1860, pp. 35–36.

forget or ignore the fact that for global forces, Russia has always been simultaneously just an "ideological enemy" and a "tasty morsel" as a territory with huge reserves of minerals and natural resources. Therefore, it is not surprising that in many key aspects of national development and national security, post-Soviet Russia significantly "loses" to itself from the Soviet period. In particular, **according to the social inequality issue, the Russian Federation reached the level of 1905 in 2015**[17] *(Table)*.

Dynamics of the share of incomes in Russia

Population category	1905	1990	2015
10% of the richest	45	25	45
40% with average income	35	45	40
50% with low income	15	30	18

Own compilation according to: Novokmet F., Piketty T., Zucman G. *From soviets to oligarchs: inequality and property in Russia, 1905–2016*. National Bureau of economic research. Cambridge, MA August, 2017. P. 4.

A very important point that explains exact purposeful strategy of global forces to "plant" soullessness among the Russian elites and then among general population is **the latent nature of the process. This is a game of stimulating not anti-patriotic sentiments (which can always be detected and limited with legislative activity), but certain personal qualities inherent to capitalism and postmodern society: selfishness, greed, unrestrained desire to increase income, surrounding oneself with luxury and comfort items, and at the same time – permissiveness, individualism, willingness to ignore the norms of morality and ethics in order to achieve personal goals.**

In a real, empirical dimension, this is reflected in the incomparable size of financial and other types of inequality among population: starting conditions for development, opportunities to rely on the fairness of social (including legal) protection. **Ultimately, it increases dissatisfaction of society with the effectiveness of public administration**. **There is a growing need for change or, in the worst case, supporting actions organized by the non-systemic opposition. As with any other disease, you can fight this only by working on the causes, and not the consequences of the developing pathology.**

"[The state will] is eroded by two streams. The first one is a corruption – everything is clear with it. The second one, adjacent to the first one, is much worse. **This is the desire to be friends with the West, to be an "enlightened European", fear of being called "undemocratic", an "authoritarian strangler of freedoms".** Such representatives of the elite want to go to the West to travel, "eat the most delicate craft cheese in the mountain alpine villages" (nearly an exact quote), buy property there, teach children "for real", and so on.

If the state was not blurred by all this, then we would have something similar to China… We must understand that China is a country governed by the Communist Party, and it lives according to five-year plans. **There, a prop with these kinds of private companies is needed only to create a facade for the West.** Nearly all billionaires, effective "startups", and leading private managers in China are members of the CPC... and they comply with all party regulations"[18].

According to FCTAS RAS, in 2012–2019, the share of Russians who believe that "the country needs changes, new reforms in financial and political life" increased by 29 p. p. (from 28 to 57%). The share of those who believe that "the country needs stability that is more important than changes" decreased by 29 p.p. (from 72 to 43%)[19].

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

[18] Fefelov A., Ashmanov I. Digital battle has begun. *Zavtra.* January 14, 2021. Available at: https://zavtra.ru/blogs/tcifrovaya_bitva_nachalas_

[19] *On Relevant Problems of Our Life and Interaction of Regulators, Business, and Citizens. Report on the Results of a Mass Sociological Study. Vol. 1.* FCTAS RAS. Moscow, 2019. P. 9.

A specific example and consequence of the soullessness "infection" is the growing dynamics of a number of dollar billionaires. Their number over the past 14 years (2006–2020) has increased in Russia from 60 to 102 people, and their capital grew up from 153 to 278 billion rubles on average per billionaire *(Ins. 3; Tab. 1)*. At the same time, there are **ten- and even a hundredfold** gaps between the level of average wages of ordinary employees and an amount of remuneration of management representatives in key banks and metallurgical companies of the country *(Ins. 3; Tab. 2)*, the amount of dividend payments to their top managers exceeds the budget revenues of the regions where the corporations are based *(Ins. 3; Tab. 3)*. The situation has not changed for many years, and numerous expert opinions on the unacceptability of such blatant inequality in Russia simply remain "behind the scenes" of the current agenda of the ruling elites, who themselves are the beneficiaries of the current situation.

The deeper consequences of this are the steady upward trend of negative assessments of population about most of the main aspects of life, including not only the economic and social situation, but also the moral state of society *(Ins. 4; Tab. 4)*, as well as a high level of apoliticality among population, which concerns, in addition to real participation in socio-political events, the very idea of people about the possibilities of influencing the political situation in the country *(Ins. 4; Tab. 5)*.

Against the background of the destroyed Soviet system of values by the elites of the 1990s, and the absence of a new post-Soviet Russia's system of values, the mechanism of latent instillation of soullessness works virtually without any obstacles. The hybrid war that Russia has been involved in since 2000 (since the beginning of V. Putin's presidential term), which became even more evident in 2007 (after the "Munich speech" of the President of the Russian Federation at the international conference on politics and security[21]), includes not just various insinuations, such as the situation in Ukraine, information stuffing, economic sanctions, scandals around Russian sports, harassment of the Russian-speaking population abroad, attempts to rewrite history, etc., **but also the implantation of the values of "consumer society", postmodernism, including soullessness as the main attribute of these capitalism stages. If Russia is an "ideological enemy", then the victory over it must be mostly the same.**

> "...we should prepare for an active "expansion of values": "Who is not with us is against us" in a completely standard form, and it is enough to disagree on any of the many points for the opposite conclusion. The outcome of this expansion is, of course, not predetermined in either direction. But the willingness to meet it as one of, if not the most important, forms of confrontation in the coming years is all the more necessary"[20].

> "The specificity of spirituality and soullessness in Russia, especially in the 21st century, is associated with the fundamental changes in its economic and social life that occurred at the end of the 20th century. As a result of these changes in Russia, first of all, there is more freedom, but there is also more arbitrariness. Secondly, on the ruins of the Soviet Union, a Western-style consumer society was formed"[22].

[20] Mukhin V. USA is changing the adversary in the new Cold War. *Nezavisimaya Gazeta*, no. 44–45, March 5, 2021.

[21] Annual Munich Conference on Security Policy. February 10, 2007. *Official website of the President of Russia*. Available at: http://www.kremlin.ru/events/president/transcripts/240344

[22] Sterledeva T., Sterledev R. Spirituality and inspirituality as challenges and risks for Russia. *Power,* 2013, vol. 21, no. 8, pp. 78–82. Available at: https://cyberleninka.ru/article/n/duhovnost-i-bezduhovnost-kak-vyzov-i-riski-dlya-rossii

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Table 1. Dynamics of the number and condition of dollar billionaires in Russia

Year	Number, people	Fortune, bil. doll.	Fortune, bil. rub.*	On average, per billionaire, bil. rub.
2006	60	337.3	9168.4	152.8
2007	100	521.7	13355.5	133.6
2008	32	102.1	2542.3	79.4
2009	62	265.0	8400.5	135.5
2010	101	432.7	13141.1	130.1
2011	96	376.1	11057.3	115.2
2012	110	426.8	13269.2	120.6
2013	111	422.2	13426.0	121.0
2014	88	337.0	12940.8	147.1
2015	77	282.6	17224.5	223.7
2016	96	386.3	25882.1	269.6
2017	96	386.4	22565.8	235.1
2018	106	417.7	26189.8	247.1
2019	100	425.1	27504.0	275.0
2020	102	392.3	28371.1	278.1
2020 in % to 2006	1,70	1.16	3.09	1.82
Average annual data for 2006–2020	89	367.4	16335.9	177.6

* A fortune, stated in Forbes in dollars, has been converted to rubles at the exchange rate set by the Bank of Russia.
Source: data of Forbes; calculations of VoIRC RAS.

In 2006–2020, the number of dollar billionaires in Russia increased from 60 to 102 people, and their capital increased from 153 to 278 billion rubles on average per person.

Table 2. Comparison of the monthly income of managers of metallurgical companies and banks with the income of workers (employees), 2019

Company	Remuneration per employee of the Management Board per month, mil. rub.	Average monthly salary of one employee (worker), thou. rub.	Remuneration to an average salary, times
Gazprombank	21.5	22.1	972.9
Sberbank	52.7	104.8	502.9
VTB	16.8	145.0	115.9
Alpha-bank	17.2	161.2	106.7
Severstal	5.8	62.0	93.5
Otkrytie	10.1	121.3	83.3
NLMK	4.1	60.8	67.4
Mechel	1.3	37.6	34.6
MMK	2.6	61.5	42.3
Tinkoff	5.7	140.0	40.7

Source: *Expert*, 2020, no. 10 (1154), pp. 36–38; open corporate governance reports.

Remuneration paid to members of the Management Board of Gazprombank exceeds average salary of employees by 973 times; Sberbank – by 503 times; Severstal Corporation – by 94 times.

Table 3. Ratio of the region's own budget revenues to corporate dividends in 2011–2020

Enterprise	Dividend payments, bil.rub.*			Region	Own revenues of the regional budget, bil.rub.			Ratio of dividends to the budget's own income, %
	Overall for 2011–2020	Average annual data for 2011–2020	2020 to 2011		Overall for 2011–2020	Average annual data for 2011–2020	2020 to 2011	
PAO "Severstal"	631.9	63.2	6.4	Vologda Oblast	578.3	57.8	2.0	109.3
NLMK Group	585.9	58.6	10.8	Lipetsk Oblast	490.8	49.1	1.8	119.4
MMK	242.2	24.2	3.3	Chelyabinsk Oblast	1368.8	136.9	1.8	17.7

Source: open corporate governance reports.

Total amount of dividends of PAO "Severstal" for 2011–2020 was 9.3% more than the Vologda Oblast's own income; NLMK dividends are 19.4% higher than the Lipetsk Oblast's own revenues. Share of the Magnitogorsk Iron and Steel Works' dividends amounted to 17.7% of total own income of the Chelyabinsk Oblast.

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Table 4. Dynamics of the assessment "deteriorated" in relation to the state of affairs in various spheres of Russian society, 2014–2020, % (ranked by assessments of "deteriorated" in 2020)

Spheres of life of Russian society	October 2014*	June 2019	September 2020	Change (+ / –) 2020 to...	
				2019	2014
Standard of living of population	30	60	68	+8	+38
State of the country's economy	24	41	62	+21	+38
Moral state of society	38	46	56	+10	+18
Situation in the social sphere (health, education, culture)	34	45	49	+4	+15
International status of the country	40	37	41	+4	+1
Situation in the field of rights and freedoms, development of democracy	18	24	32	+8	+14
Anti-corruption, law and order	25	28	31	+3	+6

*In 2014, Russians were asked to assess the changes that have occurred in various spheres of society over the past 10 years, in all other cases, the estimated period ranged from 2 to 5 years. The table shows the response options (areas of life) with the highest share of negative ratings according to data for 2020 (without considering the response option "Pension provision", for which there is no data for 2014).
Source: *Russian Society in the Conditions of the Pandemic: Information and Analytical Report of the FCTAS RAS*. Moscow, 2020. P. 13.; own calculations.

In 2020, compared to 2019 and 2014, the share of negative assessments of the state of affairs in all major spheres of life, especially the financial situation of population and the country's economy, increased in Russia (over the past 6 years – by 38 p. p.; from 30 to 68 and from 24 to 62%, respectively), as well as moral state of society (from 2014 to 2020) – by 18 p.p., from 38 to 56%.

Table 5. Attitude of population to the political system, 2018, %

Question, answer	Russia	Germany	France	Great Britain
For reference: population, million people.	*144.37*	*83.13*	*67.06*	*66.83*
To what extent, in the current political system, can people like you influence politics? (response options: "not at all"; "very little")	80	50	69	61
To what extent does the current political system of our country allow people like you to have a say in deciding which direction the government should take? (response options: "not at all"; "very little")	70	50	65	56
Have you contacted a specific politician, national or local government? (response option: "no")	93	81	87	81
Did you vote in the last election? (response option: "yes")	49	79	58	74

Source: data of the European Social Survey. Available at: http://www.ess-ru.ru/fileadmin/templates/doc/Wave_9_2018/Comparative_tabels_wave9-2018_rus.xls
Among 20 countries that participated in the study, the countries with the largest population were selected (according to the World Bank data for 2019. Available at: https://data.worldbank.org/indicator/SP.POP.TOTL)

According to the latest data of the European Social Survey (2018), residents of Russia, compared to citizens of the most populated countries in Western Europe, are significantly more likely to say that they cannot participate in politics (80%), influence actions the government (70%), do not contact specific representatives of local authorities (93%), and are less likely to participate in elections (49%).

Unfortunately, it should be stated that Russia does not win this part (the "invisible front") of the hybrid war. If earlier we could say that society was a victim of "phantom" elites[23] who seized power in the 1990s, actually plundered the country, and categorically undermined the public's trust in the state, today society itself (especially the young generation that grew up in the post-Soviet period) puts personal interests at the forefront. It is more ready to violate the law and the norms of morality to achieve personal success.

This, in particular, can be seen in the moral attitudes of "self-sufficient"[24] Russians, who "**cannot succeed without abandoning moral guidelines**"[25]. More than half of them believe that "personal interests are the main thing for a person" (67%), "to succeed in life, sometimes you have to step over moral principles and norms" (54%).

Is it not an indicator of the penetration of the "metastases" of soullessness deeper and deeper into the state "organism", gradually spreading from the higher, elite strata of Russian society to general population? Moreover, we leave out the scope of the analysis of the grotesque forms of soullessness that are increasingly appearing on television screens: from the growing virtual fraud, when more enterprising citizens, using high technologies, "fool" their less enterprising fellow citizens (especially pensioners), to online murders of animals and people for the sake of the so-called "hype" in a virtual environment...

In other words, we cannot ignore the increasingly obvious trend associated with the growth of egoism, individualism, and permissiveness in Russian society, even though it still retains traditional spiritual and moral values (family, patriotism, justice, power, which were proved by the large-scale support of the amendments to the Constitution on

"In the first six months of 2020, a number of phone and Internet fraud cases in Russia increased by **76%** compared to the first half of 2019. In 2016–2020, the number of bank card fraud cases increased **from 96 to 8,053**"[26].

"In 12 months, to November 2020, fraudsters could receive at least 0.8–1 billion rubles from users of ad sites and delivery services in Russia...only the largest fraudulent groups could receive more than 660 million rubles due to 111 thousand transfers from bank cards of deceived Russians. Now it is the second largest segment of fraud after banking. DLBI studied the Telegram channels of 116 active groups – despite the fact that there are more than 200 of them, according to the company's calculations. These channels publish all transactions of transfers from bank cards of victims of fraud. 78 banks were affected, and 81% of transactions pass through Sberbank[27]".

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[23] Toshchenko Zh.T. *Phantoms of Russian Society.* Moscow: Tsentr sotsial'nogo prognozirovaniya i marketinga, 2015. 668 p.

[24] Brief description of "self-sufficient" Russians:

✓ people who "aim to live and provide for themselves and their families independently, without a purposeful appeal to the state" (source: Gorshkov M.K., Sedova N.N. "Self-sufficient" Russians and their life priorities. *Sociological Studies*, 2015, no. 12, pp. 4–16);

✓ "a significant social group, expressing a trend toward the formation of an activist dominant in Russian society" (source: *Russian everyday life in the context of the crisis: how do we live and how do we feel? Information and analytical summary based on the results of the All-Russian study.* Moscow, 2015. P. 16.);

✓ "self-sufficient part of society is localized mainly among young and well-off Russians... the distinctive features of "self-sufficient" Russians are youth, activity, business entrepreneurship, material and social success" (source: *Ibidem*).

[25] Gorshkov M.K., Sedova N.N. "Self-sufficient" Russians and their life priorities. *Sociological Studies*, 2015, no. 12, p. 13.

[26] Fraud cases rise to record high amid the Pandemic. *RBK*. August 31, 2020. Available at: https://www.rbc.ru/society/31/08/2020/5f48ea169a79477e21e25d9d

[27] Tairov P. Experts estimated the volume of fraud for the year on ad services in the amount of up to 1 billion rubles. Available at: https://www.forbes.ru/newsroom/finansy-i-investicii/413309-eksperty-ocenili-obem-moshennichestva-za-god-na-servisah

July 1, 2020). And even despite the leveling of gender boundaries, gender identity, and other "values" of postmodernism, which in the West have almost become the norm, it is alien and categorically unacceptable for most Russians today.

According to experts, "collective Biden" (even if individually he cannot think clear, it does not matter) has general rational strategy[28], therefore, as concrete as the goals of the global elites are, so are the results they have achieved in "eliminating the forms of collective identity"[29] by erasing gender, age, national, and other differences to turn a "reasonable person" into a "service person". The main, and perhaps the only, obstacle to the further penetration of the pro-Western values of the "consumer society" into Russian society is the ideology, which in the Russian Federation is under an official constitutional ban[30]. In many ways, therefore, the Russian idea is still an amorphous understanding of patriotism, which works flawlessly only in crisis situations.

There are attempts to formulate the main postulates of the Russian ideology, and it is difficult to disagree with them: "spiritual bonds"[31], "Russian peace"[32], "deep state"[33], "Russian codes"[34] – these concepts are related to the ideology of the new post-Soviet state. But they are disparate concepts; they lack unity and consistency (including due to the constitutional ban on official state ideology); they do not "sit in the heads" of ordinary citizens, so, even though they are largely consonant with each other, they do not work as a Large Ideology for a Large Country should – to consolidate society, and not only in crisis moments of history.

The President's concerns about the dominance of a single ideological point of view are quite understandable and justified. In his first program article, V.V. Putin noted that "if there is a state ideology as something officially blessed and supported by the state, there is, strictly speaking, practically no room for intellectual and spiritual freedom, ideological pluralism, and freedom of the press. And, therefore, no political freedom"[35]. Nevertheless, in the same article, he calls the "Russian Idea" the primary "chance for a decent future", and it also says that "achievement of a necessary growth dynamics is not only an economic problem, but also, in a certain sense, an ideological one. More precisely, ideological, spiritual, and moral"[36].

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[28] Dugin A. Geopolitics of Novorossiya 7 years later. *Official website of the Izborsky Club*. April 9, 2021. Available at: https://izborsk-club.ru/20918

[29] Dugin A. Manifesto of the Great Awakening. *Zavtra*, March 7, 2021. Available at: https://zavtra.ru/blogs/manifest_velikogo_probuzhdeniya

[30] Art. 13 of the Constitution states that "The Russian Federation recognizes ideological diversity. No ideology can be established as a state or mandatory one".

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

[32] This term appeared in ancient Russian sources, and its modern interpretation is most often attributed to the first half of the 1990s, and it is associated with the names of P. G. Shchedrovitsky and E. V. Ostrovsky. In modern understanding, there is no precise definition of the concept of the "Russian peace". At first, it was a cultural and historical idea of an international, interstate, and intercontinental community, aimed at uniting disunited Russian-speaking compatriots; since the 2000s, it has been characterizing not only cultural, but also geopolitical reality.

[33] Surkov V. Putin's long state. *Nezavisimaya gazeta*. February 11, 2019. Available at: https://ng-ru.turbopages.org/ng.ru/s/ideas/2019-02-11/5_7503_surkov.html

[34] Prokhanov A. Ideology as a revelation. *Official website of the Izborsky Club*. March 5, 2021. Available at: https://izborsk-club.ru/20746

[35] Putin V.V. Russia at the turn of the millennium. *Nezavisimaya Gazeta*. December 31, 1999. Available at: https://www.ng.ru/politics/1999-12-30/4_millenium.html

[36] *Ibidem*.

According to experts, following the "Marxist" understanding of ideology as a "manipulative technology of public administration", the ideology that is **an instrument of "consciousness of society as a total, integral society" is being eliminated in Russia**...This very ideology defines and reproduces the basic model of the unity of a given society, its members' main models of behavior and thinking, main patterns of coordinated interaction of classes, social groups and strata with each other, the most important patterns of social communication. Besides, it ensures the survival and development of society in history, and it is the most important component of the total system power of a given state[37]".

"In 1991, the Soviet state still had a powerful army with nuclear and thermonuclear weapons, numerous divisions, strategic missiles, tens of thousands of tanks, strong special services with rich experience in countering internal and external enemies, it was the second economy in the world, and the CPSU had 18 million members... **But since the consolidating ideology in the Soviet society disappeared, evaporated, the USSR collapsed... and its tens and hundreds of millions of residents watched with indifference and open mouths as they quickly turned from a "great people" into a crowd"**[38].

Putin's personal attempts to formulate the foundations of the state ideology (or national idea), despite his role in the political system and public opinion assessments, are **limited to the elite and remain only public rhetoric against the background of the ideology of "crony capitalism" that they actually build.** In this regard, Russia is significantly inferior to China, and the country can hardly count on a deep ideological tandem with it in the context of increasing geopolitical

"China is a socialist country. In the materials of the last party congress, they recorded that the main enemy for them is capitalism. What are we building? What kind of friendship can we talk about?"[39]

"For 25 years, the so-called crony capitalism has been built in Russia. The economic model was imposed on us, and, in fact, we gave our future into someone else's hands...

Ideologically, we decided to move to a market economy. And we were imposed a certain model of the transition economy. The phrase "transition economies" appeared even in statistics: there were economies of developed countries, developing countries, and instead of socialist economies, transition ones appeared. **This false philosophy led us to a dead end... You see, there were less parasites back then. Today, under the guise of top managers, various servants, protocol, personal planes and palaces, as a result, one with a bipod has seven with a spoon... instead of American modern capitalism, we got something that is well known the literature – crony capitalism, when neither the state, nor the market work...**

The arrival of V.V. Putin saved the country from a collapse. He restored the vertical of power, managed to return constitutional powers to the state, and ensured the unity of the country. There was a small miracle in the economy then – oil prices rose, and suddenly it turned out that we could so easily ride the wave of the world economy on purely raw materials... We were given stabilization. Stabilization in the administrative system, in management, in politics, and in the economy. But this stabilization **consolidated the vicious elements of the economic management system that were formed at that time"**[40].

[37] Sultanov Sh. Mystique of Ideology. *Zavtra*. March 3, 2021. Available at: https://zavtra.ru/blogs/mistika_ideologii

[38] *Ibidem*.

[39] Interview of the President of the Academy of Geopolitical Problems, Colonel-General L. Ivashov to the newspaper "Argumenty Nedeli"(source: Uglanov A. Russia can still stop the Donbas war. *Argumenty Nedeli*. April 6, 2021).

[40] Glazyev S. Yu. We have put future in the wrong hands. *Official website of the Russian Academy of Sciences*. December 8, 2016. Available at: http://www.ras.ru/digest/showdnews.aspx?id=08375c9b-f9a9-46ad-972d-ee33c182ded2&print=1

tensions. The situation in the country is further aggravated by the instability of the internal political situation associated with the new political cycle that will come after the State Duma elections in 2021 and the presidential elections in 2024.

Thus, the answer to the main question, which we put in the title of the article, can be analyzed from two angles:

1. The first angle is tactical. It is the fact that currently (namely, after the victory of J. Biden in the US presidential election), supranational elites start the implementation of an aggressive policy to regain the power over humanity that they were gradually losing. In this context, the lack of spirituality of the Russian elites poses a threat to national security as an inability to effectively respond to the most important demands of society – in achieving social justice, dynamic development of the level and quality of life, as a result of which the internal potential for the consolidation of society and power is lost.

2. The second perspective to look at the consequences of soullessness of the ruling elites is a strategic, deeper one. It is the fact that all the successes achieved in the process of building a new, multipolar model of the world order are in danger of disappearing. From this point of view, we can say that soullessness of the Russian elites is a phenomenon that accompanies the country throughout the entire period of building a new post-Soviet statehood, as a result of which its roots have already begun to spread deeply into all layers of Russian society... **Soullessness becomes a part of an everyday life largely due to the lack of a clear, well-ordered, ideological (or ideological) system shared by the majority of population. While there is no such system, "Russian society continues its hybrid transit to a socio-cultural nowhere" – along the track of "crony capitalism"[41].**

> "With low moral qualities (and sometimes their complete absence) and a hypertrophied craving for the appropriation of material wealth, **the ruling elite does not need high spiritual values (such as humanity, idealism, self-sacrifice), it prevent them from being in power... Based on this, the ruling elites inculcate total lack of spirituality in its environment and in the surrounding society, depriving people of high human qualities.**
>
> The elite does not need people asking them uncomfortable questions about the immorality of the government itself and making loud statements about the immorality of "high society". For this purpose, **the ruling elite creates a soulless space around itself,** which, like a poisonous field, spreads among people, seeking to poison social relations. **Citizens who find themselves in a corrupting atmosphere of soullessness, as well as the elite, should become unprincipled, greedy, aggressive, but only in relation to each other.**
>
> **It is not difficult for the ruling elite to create mass soullessness throughout the country, since all the mass media-television, radio broadcasting, the press, and the Internet are concentrated in its hands.** The ruling elite controls all the key ministries that regulate the spiritual life of people in the state. The elite appoints its protégés to the ministries of education, science, culture, social development, etc., initially defining for them a destructive policy aimed at the decomposition of society in specially created conditions of soullessness" [42].

[41] Lapin N.I. Finding ways to substantial life changes for the better: professional discourses and algorithm to study ways preferred by the population. *Economic and Social Changes: Facts, Trends, Forecast*, 2018, vol. 11, no. 4, p. 83.

[42] Mamychenko A.V. *Replacement of Destructive Elites. New People of the Creative State. Professional Parliament.* Book 2. Astrakhan: Volga, 2018. P. 90.

In this situation, the optimism is inspired by the fact that the problem of ideology and civilizational identity of Russia, as one of the leading centers of the multipolar world, is increasingly recognized and articulated by domestic scientists, economists, and public figures[43]. Their specific proposals are not always heard, but it is obvious that they form a certain critical mass, reflecting, among other things, the demand of Russian society for confidence in the future (both within the country and in the external political situation).

This critical mass, in our opinion, led to the change of the liberal Constitution of 1993, making it more social, aimed at the realization of national interests and supporting general population. This was an important step for not only consolidating society in the period of the epidemiological crisis associated with the spread of Covid-19 and stabilizing the country's political system in the conditions of the constitutional restriction of V. Putin's presidential terms, but, in the global historical context, **for forming a barrier to the further development of the values of the "consumer society" in Russia and automatic progress along the path of the "postmodern stage" that is frankly disastrous for the country.**

"Nationalization of elites in a broad sense is the strategic goal of these decisions and actions – to form truly nationally oriented elite that can make the country strong and well-equipped...

Nationalization of elites is a vital need, which is dictated by objective reality, economic expediency, and nature of the geopolitical situation. Its essence is simple: if you want to remain in an elite environment, be successful in large business, feel confident in the status of a person of a high political or socio-civil level, you must be ready **to significantly restrict your political, economic and civil liberties, be able to consciously subordinate your private interest to the public interest.** This is the main social purpose of a democratic state governed by the rule of law, socially oriented business, civil society, and a spiritually mature creative community"[44].

Currently, we need a real transition from the declared goals and objectives of development to their practical implementation, which requires **an active continuation of the nationalization of elites as "a set of systemic solutions and actions aimed at reorienting the status positions, lifestyle, and actions of specific representatives of the elite to the interests of society and solving vital problems of their country and their own state"[45].**

[43] See, for example:
Lapin N.I. Hybrid transition and a demand for "modernization for all". *Bulletin of the Institute of Sociology,* 2018, no. 27, pp. 105–136.
Delyagin M. G. New Russian Ideology. *Official website of M. Delyagin*. February 5, 2021. Available at: https://delyagin.ru/articles/191-materialy-mgd/88332-novaja-russkaja-ideologija
Glazyev S. Ideology or death! *Zavtra*. August 20, 2020. Available at: https://zavtra.ru/blogs/ideologiya_-_razmishleniya
Prokhanov A. Ideology as a revelation. *Official website of the Izborsky Club*. March 5, 2021. Available at: https://izborsk-club.ru/20746

[44] Latov Yu.V. Discourse on the "nationalization of elite" as an object of sociological analysis. *Sociological Studies,* 2020, no. 11, pp. 128–138.

[45] *Ibidem*.

This is the only way to make a 180-degree turn from a postmodern society to a society of "real humanism"[46], from a state of oligarchic capital to a social state "based on Russian (general and regionally specific) and taking into account historically tested foreign forms and methods"[47].

"... It seems to me that **the new Russian idea will be born as a fusion, as an organic combination of universal, universal values with the original Russian values that have stood the test of time...**

The key to the revival and rise of Russia is currently in the state-political sphere. **Russia needs a strong state power and must have it...** A strong state power in Russia is a democratic, legal, and capable federal state"[48].

It seems that today only the President is able to continue strengthening the foundations of the Russian idea, which he voiced back in 1999 (in the article "Russia at the turn of the millennium") and which was implemented for real 20 years later in the amendments to the Basic Law initiated by him.

In 2012, the report of the Communication Holding "Minchenko Consulting" was published. It showed the current scheme of the upper level of the ruling elites, called "Politburo 2.0" by experts.

Probably, over the past 10 years, there have been no significant transformations in the "Politburo 2.0", since there are no radical changes in the efficiency of economic development and improvement in the quality of life among general population.

"The ruling elite of Russia can be described in the model of the Soviet collective power body – the Politburo of the CC CPSU. Informal network structure of the coordination of interests of the main elite clans, in which the arbiter and most influential figure is Vladimir Putin...

In the 2000s, under the influence of several factors... a style of political decision-making has emerged into something that increasingly resembles the model of the Soviet Politburo, or "Political Bureau 2.0". The transition to this model was facilitated by the emphasis on the creation of state corporations –"national champions", made in politics and in the economy.

The specifics of the "Politburo 2.0" are that it, first of all, rarely meets at general meetings. Second, the formal status of its members does not always correlate with a real influence on the decision-making process. Third, several elite circles have formed around the "Politburo 2.0", which can be conditionally designated as "power", "political", "technical", and "entrepreneurial". These circles, on the one hand, are the mainstay of the "Politburo 2.0" in the process of power, and, on the other hand, they themselves compete with each other for influence on the "Politburo 2.0"..."[49] .

Today, it is difficult to predict the further development of the international situation and the upcoming decisions by the President regarding the modernization of the public administration system. However, it is obvious that modern conditions display the need to implement new tasks to ensure the worthy competitiveness of the Russian Federation in domestic socio-economic development and in external political arena.

[46] Lapin N.I. Humanist choice of Russian population and focuses of Russian sociology. *Sociological Studies,* 2016, no. 5, p. 27.

[47] Lapin N.I. Formation of a social state as a way of successful evolution of society. *Sociological Studies,* 2018, no. 8, p. 7.

[48] Putin V.V. Russia at the turn of the millennium. *Nezavisimaya Gazeta.* December 31, 1999.

[49] *V. Putin's Big Government and the Politburo 2.0: Report.* Communication Holding "Minchenko Consulting". 2012. Pp. 3–4.

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Modeling Socio-Demographic Asymmetry of Territorial Development*

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Abstract. The article explores the issues of modeling socio-demographic asymmetry using spatial econometrics. Its relevance is associated with the growing disproportions of demographic dynamics in the regional space that undoubtedly requires scientific understanding and development of appropriate management decisions. The purpose of this study is to substantiate the methodological provisions for modeling the socio-demographic asymmetry of territorial development using a case-study of a specific region. Based on an analysis of domestic and foreign publications on the study of the territorial development asymmetry, including socio-demographic one, the author proposes a typology of methodological approaches and methods of its modeling and evaluation and substantiates the need to use spatial econometrics methods, the advantage of which is not only an opportunity to assess the presence of the asymmetry phenomenon, but also to determine the links between studied territorial entities and evaluate their mutual influence in the conditions of uneven development of regional space. The calculation of Moran's global and local indices using a case study of the Sverdlovsk Oblast's settlement system allowed us to obtain the following results: (1) the presence of socio-demographic asymmetry in the form of spatial autocorrelation of the population indicators of the region's municipalities was confirmed; (2) a typology of municipalities is proposed according to their contribution to the formation of socio-demographic asymmetry, which allowed us to determine the points of agglomeration attraction, as well as to show the presence of direct and inverse spatial relationships between the region's key territories;

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(3) the author substantiates the trend of increasing socio-demographic asymmetry in the region as a result of the increasing role of the Yekaterinburg agglomeration and the decline in the value of other two attraction points in the settlement system. The results obtained can be used by interested specialists to justify measures to regulate the socio-demographic and spatial development of the region by using positive and leveling negative effects of the socio-demographic asymmetry.

Key words: socio-demographic asymmetry, population, spatial modeling, settlement system, region, territorial development.

Introduction

The uneven distribution of natural resources and productive forces that tend to them, which have historical, national and socio-cultural characteristics of development, provides significant differences in the levels of territories' socio-economic development not only within the country's borders as a whole, but also often within a single region. To describe this phenomenon in the regional economy, we use various terms: disproportions, differentiation, inequality, etc., reflecting structural, hierarchical, qualitative and other aspects of unevenness. Asymmetry is a complex category that takes into account different aspects of unevenness. It is understood as stable deviations in time and space in the conditions and results of the territories' development reduction of which ensures equalization of living standards and in the long term contributes to sustainable socio-economic development in general.

At the regional level, the disparities in demographic dynamics are especially pronounced: some territories show a steady growth in population, an increase in quality of human capital and labor resources which stimulates economic growth, while others experience population outflow, a decrease in quality of human capital and slowdown in socio-economic development in general. This allows speaking about socio-demographic asymmetry of territorial development and transformation of the regional space. However, despite the fact that the phenomenon of socio-demographic asymmetry of territorial development is observable and obvious, in our opinion, it is not sufficiently understood in science. In this regard, the purpose of our research is to substantiate methodological provisions for modeling socio-demographic asymmetry of territorial development in the case of a specific region.

Theoretical review

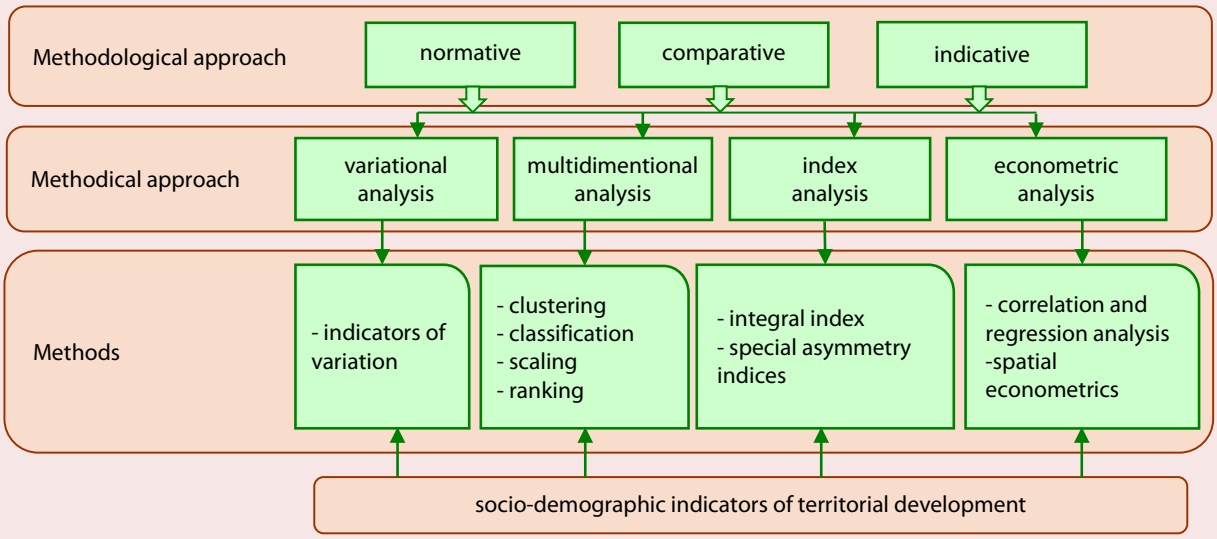
A review of theoretical approaches to understanding space and asymmetry as its inherent property in previous publications allowed defining socio-demographic asymmetry as follows [1]:

– as a process of asymmetric reproduction of human capital in different territories of the region, provided by uneven dynamics of demographic processes (birth rate, mortality, migration) and appropriate infrastructure development (health, education, culture, etc.);

– as a result of population placement in the region's space in the form of a heterogeneous settlement system which is transformed under the influence of a complex of factors of different nature (natural and climatic, scientific and technological, socio-economic, political, institutional, etc.).

Such a comprehensive understanding of it allowed attracting a wide range of studies to substantiate the typology of methodological approaches and methodological tools for assessing socio-demographic asymmetry of territorial development. Systematization of methodological approaches is based on the criteria of similarity of the research objects, similarity of methodological apparatus, proximity of the goals and objectives of the study, specific characteristics and features. The resulting typology of methodological approaches and evaluation methods presents in *Figure 1*.

Figure 1. Typology of methodological approaches to the assessment of socio-demographic asymmetry of territorial development



At the level of the methodology for assessing socio-demographic asymmetry, we can distinguish normative, indicative and comparative approaches. Regulatory approaches involve comparing the achieved level of the region's development with individual standards defined by legislative acts at the federal, regional or municipal level. In this sense, development uniformity and sustainability is ensured by implementation of the relevant standards. Indicative approaches are based on the assessment of targets set by various development programs and projects the achievement of which in all territories ensures balanced (symmetrical) development. The most commonly used method is to evaluate effectiveness and efficiency of program implementation.

Comparative approaches are mainly aimed at a comparative analysis of the current situation in different territories which allows using a wide variety of assessment methods. The advantage of the comparative approach is greater freedom in the choice of indicators and evaluation methods, depending on the purposes of the study, and the presence of a significant number of publicly available statistics increases the confidence level in the estimates and allows verifying the results.

Depending on the purposes of the analysis, different methodological approaches to the assessment of socio-demographic asymmetry can be chosen. The first group includes methods of variational analysis of indicators of socio-demographic development; its main advantage is the ability to assess the heterogeneity degree of the analyzed indicator values. In addition, calculation of variation indicators is possible for both absolute and relative indicators [2]. To assess territorial development asymmetry, calculation of variation range (amplitude of fluctuations) is used [3; 4; 5], mean quadratic deviation [6], variation coefficient [7; 8], or the analysis of several variation indicators in the complex [9; 10; 11]. The use of variation indicators allows comparing territorial development asymmetry in different sections, as well as in dynamics.

The second group of methodological approaches to assessing socio-demographic development asymmetry consists of multidimensional analysis methods. Their main goal is implementation of the

typologization of territorial entities in accordance with manifestation intensity of spatial differences (development asymmetry). Depending on the research objectives and availability of mathematical tools, scientists use ranking and clustering [12], multiparametric structural diagnostics [13], graph theory [14], and others. Among their key advantages, we should note the possibility of identifying subtle, hidden factorial influences, admissibility of comparisons of territorial systems in the complex of studied parameters, possibility of developing strategic and tactical decisions related to the management of territorial systems at different levels, and their segmentation for developing management measures and new decision-making algorithms.

The third group of methodological approaches to assessment of socio-demographic asymmetry includes methods based on the calculation of integral indices and assessment of their hetero-geneity which are a procedure for selecting the most significant indicators used in the future to compare territorial systems, factor assessment of the state of the territorial system, intraregional differences in individual indicators, as well as formation of integral indicators for subsequent typologization of territories [15]. The advantage of this approach is that it makes it possible to obtain a generalized indicator for each of the studied areas (spheres), representing a certain methodological unity of particular indicators; it allows comparing and distributing territorial formations both in one of the studied areas of asymmetry, and in several [16]. However, the presence of a significant number of indicators leads to an increase in the volume and complexity of calculations, makes it difficult to assess the impact of each factor on the change in the resulting indicator, and also reduces the ability to compare the results of various studies with each other.

The fourth group of approaches consists of methods based on the complex application of statistical methods for the analysis of territorial differences using various methods of mathematical modeling. First, researchers use the definition of "average standards", calculate the deviations of the current values of indicators from the standards, and evaluate contribution of each indicator to the formation of the unevenness level [17]. This allows identifying the magnitude of inter-territorial differences, establishing unevenness stage, which corresponds to the detected differences, highlighting territories with a higher level of development and lagging territories, as well as the main factors that stimulate or hinder the territories' development.

Secondly, the article uses various modifications of the methods of correlation and regression analysis (construction of regressions on panel data, for example, Zipf's distributions [18; 19; 20], analysis of convergence/divergence processes of territorial development [21]), and spatial econometrics (for example, construction of Moran's spatial autocorrelation model [22; 23; 24]). They are popular abroad and only recently have begun penetrating into domestic practice of spatial research [25]. At the same time, they allow not only assessing the presence and degree of disproportions of territorial development, but also determining the links between the studied territorial entities and considering their mutual influence. In this regard, it is the methods of spatial econometrics that we have chosen as the methodological tools of the study.

Data and methods

Data

An objective indicator of the assessment of socio-demographic asymmetry as a result of settlement processes is the population size. This is one of the few indicators for which it is possible to form a fairly long retrospective series at the municipal level which allows searching for patterns in the spatial distribution of population and its dynamics using mathematical methods. As the settlement system is quite inert, and its transformation requires a significant period of time, we have chosen the largest available period

of thirty years, starting from the earliest statistical data (census of 1989) and ending with the most recent data on the municipalities' population at the beginning of 2019[1] on the basis of which Moran's local and global indices are calculated. The weight matrix is formed taking into account the distances between the central localities of municipalities, calculated by roads according to the information of specialized sites[2]. The choice of a standardized matrix is associated, first, with the established practice of similar studies when it is the distances on roads that are recognized as equivalent for estimating the distance of points in socio-economic space; second, it is with data availability and a relatively simple calculation algorithm compared, for example, with the isochron estimation.

Methods

The socio-demographic asymmetry reflects the heterogeneity of the region's settlement system which makes it possible to use spatial econometrics methods [26] to visualize the uneven spatial development and groups' formation of similar and different territories. One of them is the method of modeling Moran's spatial autocorrelation [27; 28] which includes calculation of Moran's global and local indices.

Moran's global index allows assessing the presence or absence of spatial autocorrelation between the values of indicators of neighboring territories and is calculated using the formula (1) [29]:

$$IG = \frac{\sum\sum(x_i - \bar{x})(x_j - \bar{x})}{\sum(x_i - \bar{x})^2} = \frac{N}{\sum\sum w_{ij}}, \quad (1)$$

where N – number of territories; w_{ij} – an element of the matrix of spatial weights for territories i and j; $x_{i,j}$ – an indicator's value for a specific territory; $\bar{x}$ – an indicator's average value.

The presence of spatial autocorrelation and its nature (positive or negative) are determined by testing the hypothesis of the significance of Moran's global index using z-statistics according to the formula (2):

$$Z = \frac{IG - EI}{\sigma} \quad (2)$$

and estimates of the null hypothesis about the theoretically random structural regularity of the spatial model.

The qualitative characteristics of spatial autocorrelation are analyzed by comparing IG with the threshold value EI, calculated as (3):

$$EI = \frac{1}{n-1}, \quad (3)$$

where n – number of objects in the selection.

If $IG > EI$, then there is a positive spatial autocorrelation (i.e., the values in neighboring territories are similar), if $IG < EI$, then negative autocorrelation (i.e., the values in neighboring territories are different), if $IG = EI$, then there is no autocorrelation (the values are randomly arranged) [29].

In the presence of spatial autocorrelation, Moran's scattering diagram is constructed where z-standardized values of the indicators are plotted along the horizontal axis, and the values of the spatial WZ vector are plotted along the vertical axis. Thus, the territories are clustered in four quadrates characterized by different qualitative parameters *(Tab. 1)*.

Moran's local indices *(LISA)* are calculated for each territory separately and allow assessing the presence or absence of spatial autocorrelation of a particular territory with neighboring ones. The calculation formula is as follows (4) [29]:

$$LISA_i = N \cdot \frac{(x_i - \bar{x}) \cdot \sum w_{ij}(x_j - \bar{x})}{\sum(x_i - \bar{x})^2}. \quad (4)$$

[1] https://www.citypopulation.de/en/russia/ural/admin/ (accessed: May 26, 2020).

[2] https://yandex.ru/map; https://www.avtodispetcher.ru/distance/

Table 1. Qualitative characteristics of quadrates of Moran's scattering diagram

Quadrate LH (low-high)	**Quadrate HH (high-high)**
The territories have relatively low eigenvalues of the analyzed indicator, are surrounded by territories with relatively high values of the analyzed indicator; autocorrelation is negative	The territories have relatively high eigenvalues of the analyzed indicator, are surrounded by territories with relatively high values of the analyzed indicator; autocorrelation is positive
Quadrate LL (low-low)	**Quadrate HL (high-low)**
The territories have relatively low eigenvalues of the analyzed indicator, are surrounded by territories with relatively low values of the analyzed indicator; autocorrelation is positive	The territories have relatively high eigenvalues of the analyzed indicator, are surrounded by territories with relatively low values of the analyzed indicator (growth poles); autocorrelation is negative

It is also worth noting that the sum of Moran's local $LISA_i$ indices for all territories is nothing more than Moran's global *IG* index.

Results and discussion

During the period 1989–2019, the settlement system of the Sverdlovsk Oblast underwent a number of changes *(Tab. 2)*. For instance, region's population increased from 3785.0 to 4169.9 thousand people which was 110.2%. During the same time, as a result of the local government reform, the number of municipalities in the region increased from 61 to 69 units. At the same time, the average population of the municipality decreased from 62.0 to 60.4 thousand people, or by 2.5%. The coefficient of population variation in municipalities also decreased from 34.3% to 32.8% which may indicate some convergence of the region's territories in this indicator.

Based on the data on population in the Sverdlovsk Oblast municipalities in 1989 and 2019, we calculated Moran's global index using a standardized distance matrix *(Tab. 3)*.

The analysis of *z*-statistics values allowed concluding that the spatial distribution of population values in the region's municipalities is not random. And *IG* comparison with the threshold *EI* value shows the presence of negative spatial autocorrelation. This indicates

Table 2. Dynamics of the settlement system indicators of the Sverdlovsk Oblast in 1989–2019

Indicator	1989	2019
Population, thou. people	3785.0	4169.9
Number of municipalities, units	61	69
Average number of municipalities, thou. people.	62.0	60.4
Average quadratic deviation of population of municipalities	180.6	184.3
Coefficient of variation in population of municipalities, %	34.3	32.8
Urban population concentration index	0.521	0.563
According to: Population of cities and towns. Available at: http://www.citypopulation.de/en/russia/ural/admin/ (accessed: May 26, 2020).		

Table 3. Moran's global population index for the Sverdlovsk Oblast municipalities based on the standardized distance matrix

Year	*IG*	*EI**	z-statistics	Spatial autocorrelation
1989	-0.0321	-0.0167	-7.18**	negative
2010	-0.0245	-0.0147	-5.02**	negative
2019	-0.0248	-0.0147	-3.44**	negative

* *EI* value changes over time due to changes in the number of municipalities in the region, their type and borders as a result of the local government reform in 2003–2009.
** If $\alpha = 0.05$, it allows rejecting the null hypothesis that the observed spatial model reflects a theoretical random structural pattern.
According to: Population of cities and towns. Available at: http://www.citypopulation.de/en/russia/ural/admin/ (accessed: May 26, 2020).

that there are statistically significant differences in the values of population index of neighboring territories. Thus, we can talk about the presence of socio-demographic asymmetry in the region.

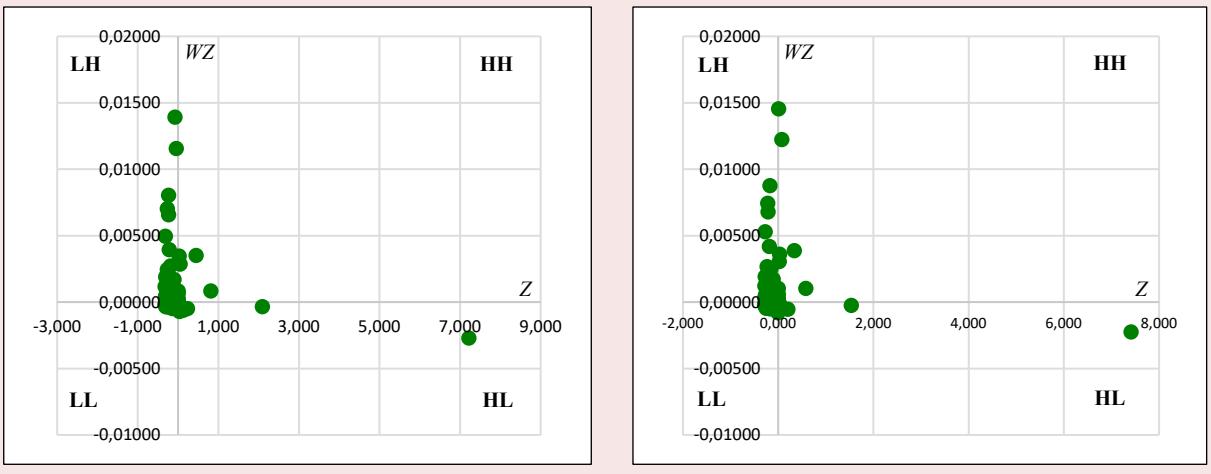
Based on Moran's scattering diagram according to standardized population data for 1989 and 2019, the Sverdlovsk Oblast municipalities are divided by types LH, LL, HH, HL (*Fig. 2*), where *Z* parameter (Moran's local index) is plotted along the abscissa axis, and *WZ* parameter (standardized distances) is along the ordinate axis.

We should note several characteristics of the obtained scattering diagrams. First, over time, there is an increase in the variation of *Z* and *WZ* indicators. If in 1989 variation range of the corresponding indicators was 7,998 and 0.0176, then in 2019 it increased to 8,207 and 0.0177, respectively, and due to the growth of the maximum values. This confirms the thesis about the strengthening of socio-demographic asymmetry and increasing weight of individual municipalities in the settlement system.

Secondly, about three-quarters of municipalities are characterized by fairly close values of *Z* and *WZ* and are located around the point (0; 0). For the study of socio-demographic asymmetry, the remaining quarter of municipalities, which are outliers and have significantly different *Z* and *WZ* parameters, are of interest. These 17 municipalities form three types depending on the quadrate of the scattering matrix they fall into (*Tab. 4*).

The first type is the territories that are included in the HL cluster according to Moran's scattering diagram, the so-called growth poles, i.e. territories that have relatively high eigenvalues of population and are surrounded by territories with relatively low population values. In the case of the settlement system of the Sverdlovsk Oblast, this type includes three municipalities (Yekaterinburg, N. Tagil and Serov) which are the cores of agglomeration formations and population attraction points from the surrounding territories. These municipalities retain the function of the core of the first order throughout the observed period, but the weight of

Figure 2. Moran's scattering diagram for the standardized population of the Sverdlovsk Oblast municipalities



a) 1989 b) 2019

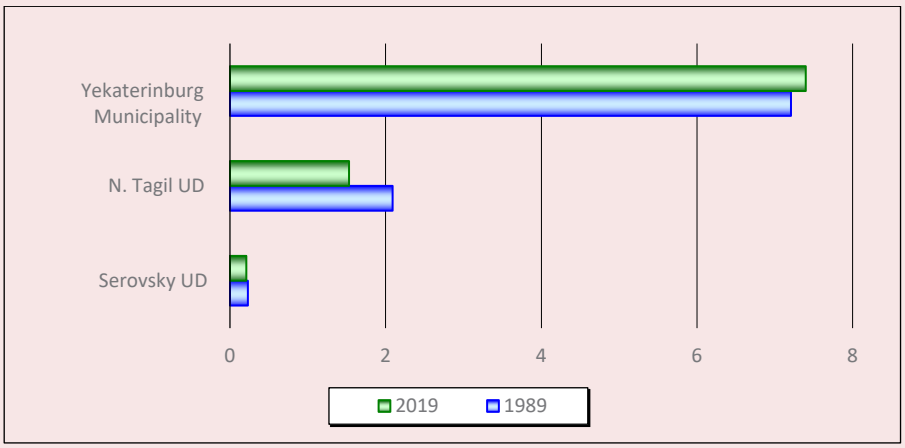
According to: Population of cities and towns. Available at: http://www.citypopulation.de/en/russia/ural/admin/ (accessed: May 26, 2020).

Table 4. Types of municipalities in the settlement system of the Sverdlovsk Oblast according to Moran's scattering diagram

Type of municipality	1989		2019	
	Municipality	Share among all municipalities, %	Municipality	Share among all municipalities, %
HL (first-order cores)	Yekaterinburg Municipality N. Tagil UD Serovsky UD	5	Yekaterinburg Municipality N. Tagil UD Serovsky UD	4
HH (second-order cores of Yekaterinburg agglomeration)	K.-Uralsky UD Pervouralsky UD Revda UD Polevskoy UD	7	Berezovsky UD V. Pushma UD K.-Uralsky UD Pervouralsky UD Revda UD Polevskoy UD	9
LH (Yekaterinburg satellite towns)	Aramilsky UD Beloyarsky UD Berezovsky UD V. Dubrovo UD Verh-Neyvinsk UD V. Pushma UD Degtyarsk UD Zarechny UD Sredneuralsk UD Sysertsky UD	16	Aramilsky UD Beloyarsky UD V. Dubrovo UD Degtyarsk UD Zarechny UD Sredneuralsk UD Sysertsky UD	10
Total*	17	28	17	23

* In 1989, the settlement system included 61 municipalities, in 2019 it was 70.
According to: Population of cities and towns. Available at: http://www.citypopulation.de/en/russia/ural/admin/ (accessed: May 26, 2020).

Figure 3. Dynamics of Moran's local indices for first-order nuclei of agglomeration formations in the Sverdlovsk Oblast



According to: Population of cities and towns. Available at: http://www.citypopulation.de/en/russia/ural/admin/ (accessed: May 26, 2020).

the first in the regional settlement system increases, and the other two lose weight in favor of the regional center *(Fig. 3)*.

Despite the fact that N. Tagil UD and Serovsky UD, being extremes for the surrounding space, have agglomeration potential, its implementation in the form of the formation of full-fledged urban agglomerations in the near future is not possible, as their weight is decreasing in the settlement system and both municipalities are characterized by a tendency to reduce the population and economic potential. In addition, they do not have second-order nuclei and/or satellite towns in their influence zone like the Yekaterinburg Agglomeration.

The second type includes territories of the cluster HH according to Moran's scattering diagram, i.e. those that have relatively high eigenvalues of the analyzed indicator and are surrounded by territories with relatively high values of the analyzed indicator. These are the second-order cores of the Yekaterinburg agglomeration: K-Uralsky UD, Pervouralsk UD, Revda UD, Polevskoy UD, as well as Berezovsky UD, V. Pyshma UD which became a part of the cluster by the end of the period. In addition, all these municipalities have positive spatial correlations with the core of the agglomeration – Yekaterinburg, i.e., in the regional settlement system, the weight of the first-order core increases with the weight of the second-order cores.

Territories of the second type are characterized by an increase in population if they are geographically adjacent to Yekaterinburg (Berezovsky UD, V. Pyshma UD), or a slight decrease in population if they are located at a distance of 50 km or more from Yekaterinburg (K.-Uralsky UD, Pervouralsk UD, Revda UD, Polevskoy UD). All of these municipalities maintain a fairly stable socio-economic situation, create jobs, and develop social and transport infrastructure. The relatively high standard of living makes it possible to keep population in place.

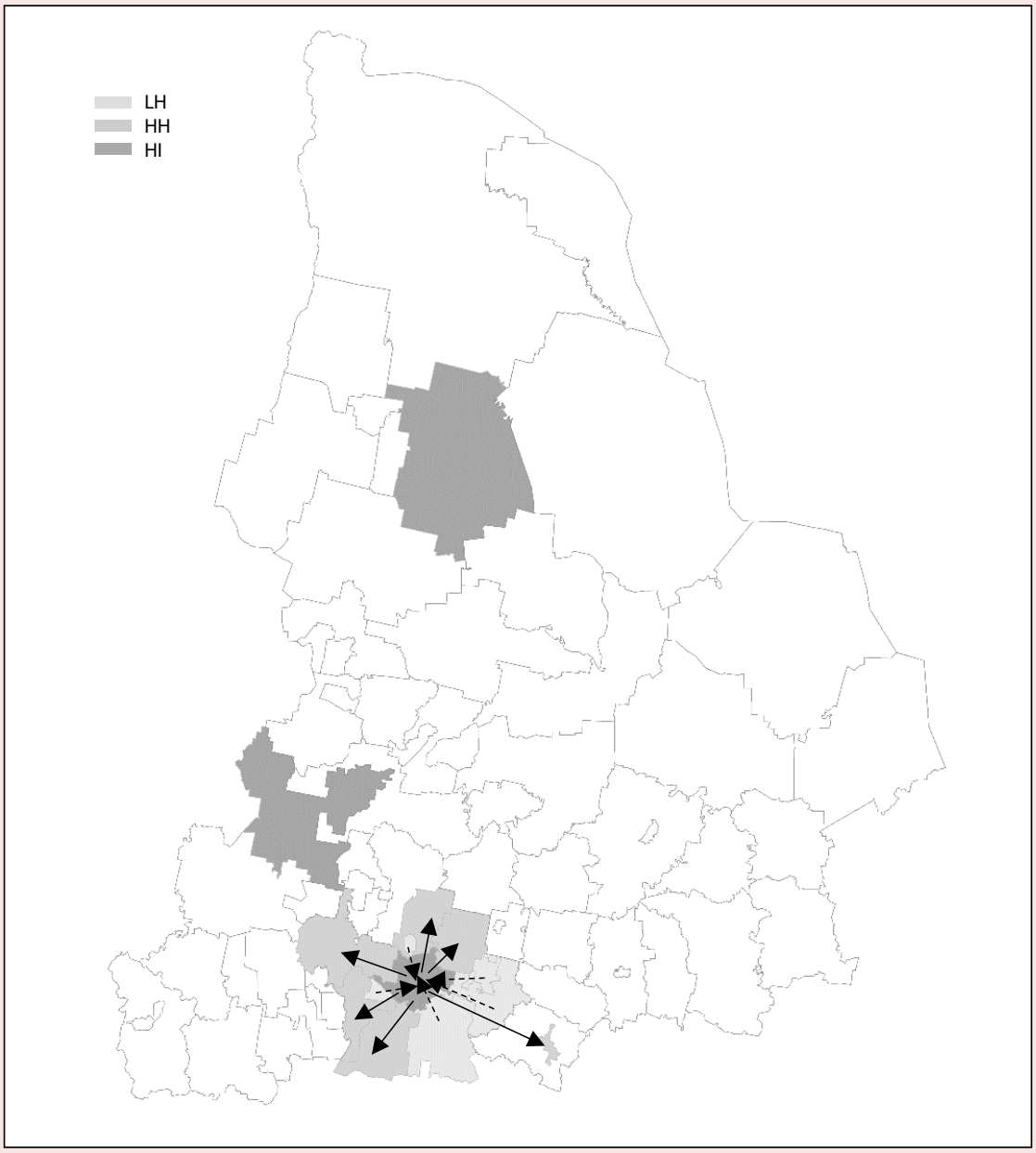
In our opinion, in the near future, these territories will retain their function in the settlement system of the Sverdlovsk Oblast and will act as population attraction points, although less significant than the regional center.

The third type of municipalities consists of the territories of LH cluster according to Moran's scattering diagram, i.e., having relatively low eigenvalues of population and surrounded by territories with relatively high values of the analyzed indicator. These include the municipalities that form the satellites of the agglomeration core (Aramilsky UD, Beloyarsky UD, V. Dubrovo UD, Degtyarsk UD, Zarechny UD, Sredneuralsk UD, Sysertsky UD). In addition, all these territories have significant negative connections with the agglomeration core and, thus, are the sources of human capital for the regional center.

These municipalities are characterized by an increase in population in 2019 by an average of 105% compared to the level of 1989. Due to cheaper housing and relatively lower prices, these territories are attractive for residents who make daily trips to work in the region's capital. At the same time, their problem is the weak development of social infrastructure with a high load on it which is due to the peculiarities of paying personal income tax at the work place, and not at home, and it is this tax that forms a large part of the municipal budget. In the future, municipalities of this type will retain their function as "sleeping areas" of the agglomeration and continue increasing population which actualizes the need to solve the accumulated infrastructure problems.

Figure 4 shows the Sverdlovsk Oblast map which presents the types of municipalities according to the typology described above, and visually reflects the structure of the Yekaterinburg agglomeration consisting of a first-order core and its satellites, several second-order cores, as well as the core of potential agglomerations moving northward in the region.

Figure 4. Types of municipalities in the settlement system of the Sverdlovsk Oblast in 2019 and relations between them



The arrows (⟶) indicate the direct agglomeration links, the dotted arrows (⇢) – indicate the reverse ones.

According to: Population of cities and towns. Available at: http://www.citypopulation.de/en/russia/ural/admin/ (accessed: May 26, 2020).

The resulting picture reflects, in general, the historically developed specifics of the regional settlement system – the so-called cluster settlement where population is concentrated in large cities, and there are dips between the concentration points[3]. In such a way, for a long time, three agglomeration formations with centers in Yekaterinburg, N. Tagil and Serov have been preserved in the region. However, their role and prospects in the regional space of the Sverdlovsk Oblast differ. If the Yekaterinburg agglomeration is economic growth point and population attraction center in the region, then N. Tagil and Serov, although still dominating at the local level, not only did not show the agglomeration potential, but also lose their importance as growth points for the settlement system as a whole. Moreover, transformation of the regional space is moving toward the formation of a single Yekaterinburg-Nizhny Tagil agglomeration with the gradual loss of the value of N. Tagil to the level of the second-order core (during the period, the value of the local index for these two territories decreased from 0.0044 to 0.0032). The mutual influence of Yekaterinburg and Serov remains at the same level, the LISA for these territories during the entire period under review is 0.0002 which is more likely due to the significant distance of the Serovsky UD (more than 350 km) than to its significance in the formation of the regional space.

At the same time, development of these agglomeration formations is fixed in the corresponding section of Socio-Economic Development Strategy of the Sverdlovsk Oblast through to 2030 where the idea of balanced development of the region's territories is spelled out[4]. However, such a task, in our opinion, contradicts the objective socio-demographic processes taking place in the Sverdlovsk Oblast. In addition, if various tools for Yekaterinburg agglomeration development are actively discussed at the regional and municipal level and appropriate regulatory acts[5] are being developed, then for the territories around the city. The task of agglomeration construction remains declarative, as the real processes of tightening the economic space to these points do not occur, the executive authorities do not offer effective measures to retain and consolidate population in these territories, and inter-municipal cooperation is developed rather poorly due to the current system of regulatory environment [30].

Conclusion

Thus, as a result of using spatial econometrics methods for the analysis of the settlement system of the Sverdlovsk Oblast, the authors have confirmed the presence of socio-demographic asymmetry in the form of spatial autocorrelation of population indicators of municipalities. In addition, the analysis of Moran's global and local indices in dynamics shows a tendency to increase disparity of demographic dynamics in the region.

Based on the results of the structure analysis of Moran's scattering diagram, we propose a typology of the Sverdlovsk Oblast municipalities depending on the significance of Moran's local indices and function that the territories perform in the regional space.

The paper has determined the points of agglomeration attraction (3 municipalities), has shown the presence of direct and inverse spatial relationships between the key region's territories, and has considered the dynamics of their significance in the regional space structure. Thus,

[3] Analysis of the territorial, age and educational structure of the labor resources of the Sverdlovsk Oblast in the medium and long term: research report. *Yekaterinburg: Expert-Ural Research Center,* 2012. 84 p., p 22.

[4] On the Socio-Economic Development Strategy of the Sverdlovsk Oblast for 2016–2030: Law of the Sverdlovsk Oblast no. 151-OZ, dated December 21, 2015. Available at: http://economy.midural.ru/content/strategiya-2030 (accessed: July 26, 2020).

[5] A number of agreements on development of Yekaterinburg urban agglomeration have been signed in the Sverdlovsk Oblast. Available at: http://midural.ru/news/on_the_eve/document173731/ (accessed: December 14, 2020)

two potential points of agglomeration attraction (N. Tagil and Serov) lose their significance in the settlement system in favor of the regional center (Yekaterinburg) for a fairly long period. Around the regional capital, a full-fledged agglomeration association was formed with the presence of a first-order core with satellite territories and the presence of the second-order cores. Close socio-economic ties between these municipalities actualize the issue of managing agglomeration processes, primarily at the inter-municipal level of interaction which is quite problematic in the current legislation and established practice of inter-municipal cooperation.

The scientific novelty of the work is methodology development for studying socio-demographic asymmetry of regional development based on the use of spatial econometrics methods that allow identifying spatial patterns of demographic region's development. The practical significance of the study is possibility to use the results to justify the strategic directions of the region's socio-economic development taking into account the identified patterns and trends of the settlement system transformation to level the negative effects of socio-demographic asymmetry and solve the problem of improving the quality of life, regardless of the place of residence.

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Analysis and Forecast of Competitiveness of Russian Investment Equipment in the Foreign Markets*

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Abstract. The conducted research was aimed at developing and advancing methods of studying the impact of investments with a high share of costs of machines and equipment, scientific studies and developments for competitiveness dynamics of Russian investment equipment and construction of forecast options for its export. The studied groups of investment equipment were formed from high-tech, technically complex, and expensive types of products. The object of the study is the competitiveness of domestic investment equipment in the foreign markets. We considered the expansion of the export geography, which allowed exploring the competitiveness in the main (traditional) markets and in the growing (including new ones) markets of the far abroad countries. The authors have assessed the demand stability. The tasks,

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achieved in the reported study, are aimed at identifying the dependencies of quantitative assessments of competitiveness on quantitative assessments of investment factors, impact of which determines the pace and efficiency of the development of investment equipment production at Russian enterprises. The developed system of indicators allows obtaining quantitative, voluminous, and price estimates of investment equipment exports to the foreign countries and to assess and predict on its basis the pace of high-tech and technological development of this important branch of domestic engineering. The results of the study show a necessity to significantly increase spending on research and update of production equipment. The growth of knowledge-intensive investments will make it possible to expand the range of investment equipment with technological competitiveness on the global market. The conducted research has shown that the tools, existing and applied in the Russian Federation, allow us to ensure the constructive dynamics of factors affecting the competitiveness of mechanical engineering and its products. However, the resources that determine the impact of these tools are still insufficient.

Key words: mechanical engineering, investment equipment, investment in fixed capital, competitiveness, export, technological structure of investments, knowledge intensity of investments.

Introduction

Strategic tasks of the country's development include high-performance export-oriented sector in industrial sectors, a significant increase in exports of non-primary sector products including the achievement of an annual export volume of machine-building products in the amount of 50 billion US dollars by 2024[1]. This task is rather difficult, given that in recent years, the volume of exports of mechanical engineering products amounted to 28–29 billion $[2]. Its solution can be provided, first of all, by increasing efficiency and reliability of the operational parameters of the exported equipment.

At the same time, in the domestic and foreign markets, the competitiveness of domestic industrial products is the most important factor in Russian economy development, its diversification and sustainability which will allow solving the problems associated with growing exports of high-tech expensive products and developing import substitution. The economic justification of the domestic demand for investment equipment as a component of the investment flow to fixed assets is presented in [1; 2], and the innovative and technological one is in [3]. The competitiveness matrix fully discloses the concept of "competitiveness of investment equipment", suitable for predictive and analytical research which can be filled with reliable statistical information. Its first column vector contains technical and operational characteristics; the second is price characteristics, the third – market characteristics and features of the promotion of investment equipment on the market. In mathematical theoretical models, a smaller number of indicators are used [4; 5]. In application models, one indicator is often used – the share of equipment in the market. However, from our point of view, it is the result of a large set of measures and efforts of manufacturers of investment equipment. We think that the influence

[1] On the national goals and strategic tasks of the Russian Federation development for the period through to 2024: Presidential Decree of the Russian Federation no. 204, dated May 7, 2018. ConsultantPlus. Available at: www/ consultant.ru/document/cons_doc_LAW_297432/

[2] *Foreign Trade Customs Statistics. Annual Collection*. Moscow: Federal Customs Service of Russia, 2010–2019.

process of investments on export dynamics deserves special study as a way to increase and display the competitiveness of domestic manufacturers of investment equipment in the market[3].

When assessing the competitiveness of manufacturing products on the world market, it is necessary to take into account many factors that act simultaneously or with a certain periodicity on various market sectors of manufacturing products including factors that shape the purchasing power of consumers. Especially difficult in this aspect is the relatively small-scale and very diverse product range of the investment equipment market – the largest among the markets for products of the machine-building industries.

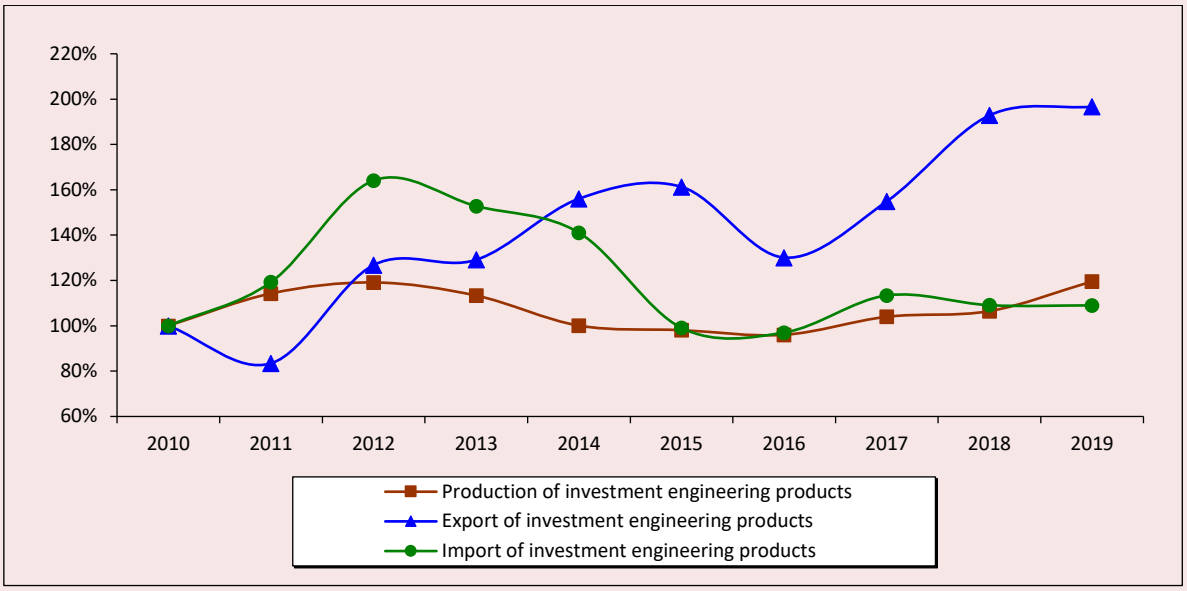
The purpose of the work is a predictive and analytical study of the impact of technical and technological, knowledge-intensive investments on the dynamics of competitiveness and construction of forecast options for investment equipment export, i.e., knowledge-intensive and technical and technological development of this most important component of domestic engineering which affects both the quality of mass production of technically complex consumer goods, and production of defense and dual-use products. The proposed method of assessing competitiveness is based on the study of the dynamics of export volumes, specific export prices and expansion of the exports' geography by investment equipment groups. In recent years, against the background of quantitative shifts in the world economy, high-tech industries have developed at a faster pace [6], so when conducting research, the studied groups of investment equipment are formed mainly from high-tech, technically complex, and expensive types of products. The object of the research is competitiveness of domestic investment equipment in the markets of foreign countries which allows considering competitiveness of both the main (traditional) and growing (including new) markets. The research tasks are aimed at identifying the dependencies of quantitative assessments of competitiveness on quantitative assessments of factors affecting the development of investment equipment production at Russian enterprises. We should note that there are quite a lot of research developments on this issue, but they are usually devoted either to narrow, local markets of buyers and sellers, or to certain types of equipment, or to issues of methodology or management [7–12].

The main growth factors in domestic investment equipment export *(Fig. 1)* over the previous decade are the factors of production development at domestic enterprises: renewal of the active part of fixed assets and introduction of innovative technologies, as well as institutional factors supporting Russian equipment export. Creation of the Russian Export Center (REC)[4] to support non-resource and non-energy businesses contributed to the geography expansion of the domestic investment equipment market. For instance, in 2008–2018, Russian investment equipment market has increased by 30 importing countries that are a part of the permanent group [13]. Currently, domestic investment equipment is exported to more than

[3] Investment equipment is ready-made machines, equipment, vehicles used in the functioning of the real economic sector. Investment equipment is produced by investment engineering industries. In this study, investment equipment includes machinery and equipment (gr. 28 RNCTEA and gr. 84 TRIED); railway engineering products (gr. 30.20 RNCTEA and gr. 86 TRIED). This is an incomplete composition of investment equipment, as transport as a branch of the real sector uses aviation equipment, shipbuilding and automotive products. However, accounting for these types of investment equipment is not provided with detailed statistical information comparable to the RNCTEA and TRIED classifiers in available publications.

[4] Russian Export Center JSC (REC) is a state institute for supporting non-resource exports consolidating a group of companies that provide Russian exporters with a wide range of financial and non-financial support measures.

Figure 1. Growth rates of output, export and import of domestic investment engineering products,%, 2010 = 100%



Source: *Foreign Trade Customs Statistics of the Russian Federation. Annual Collection.* Moscow: Federal Customs Service of RF, 2010–2019; *Russian Statistical Yearbook: stat. coll.* Moscow: Rosstat, 2011–2020.

110 countries around the world[5] . Russian exports support by companies that are REC members may contribute to influence growth of the financial factor on the dynamics of exports of domestic products, as financial assistance is also among the support measures. It is clear that export is a necessary condition for existing and functioning investment equipment production.

The policy of export-oriented development of the industrial economic sector should largely rely on the increasing support of the state [14–17]. This policy is based on the development of new models of products and technologies for their manufacture provided by domestic research and development (R&D).The lack of financial resources as a factor limiting investment in fixed assets is noted by 52% of machine-building enterprises is more than in other manufacturing industries [18].

[5] According to: *Foreign Trade Customs Statistics of the Russian Federation. Annual Collection*. Moscow: Federal Customs Service of RF, 2010–2019.

Successful promotion of domestic investment equipment to new markets of foreign countries is ensured by the dynamics of the set of parameters of technological competitiveness. The assessment of these parameters is possible by the indicators of the dynamics of the export characteristics of complex expensive types of exported products. The study of the indicators' dependence on the characteristics of investment activity in the industries that produce such equipment allows obtaining quantitative estimates of the interaction of investment and industry technical and technological factors. These estimates are the basis for the construction of forecast options for developing production and export activities of investment engineering.

An approach to studying investment equipment competitiveness

The main element of the proposed approach to the study of investment equipment competitiveness is constructing dependencies of the effectiveness

of foreign trade turnover on the factors affecting it. The index of qualitative changes in the technological structure of investments in fixed assets in the industries that produce investment equipment is chosen as the main factor that forms the effects that indicate an increase (or decrease) in competitiveness. This index characterizes the ratio of the growth rate of costs for machinery, equipment, vehicles and R&D relative to growth rate of investments in fixed assets, and therefore, for each time period of the study, an assessment of the dynamics of the main structural elements of investments in fixed assets is provided using the index of qualitative changes in technological structure of investments (I^{Tstp}, where *Tstr* is technological structure of investments), i.e., qualitative changes in the investment flow. If the index exceeds one, then knowledge-intensive and technological components increase at a higher rate in the technological structure of investments. The prolonged impact of qualitative changes in technological structure of investments on developing machine-building industries and productions is the main factor in growing exports and developing import substitution.

The study covers 2010–2019. The period is divided into two identical five-year intervals: 2010–2014 and 2015–2019. During the last 10 years, the period 2010–1014 was the most favorable in terms of investment activity in investment engineering: investment growth in fixed assets was 162.4%, in machinery, equipment and vehicles – 164.3%, growth of expenditures on research and development – 162.7%, on technological innovations (ZTI) – 122.4%[6].

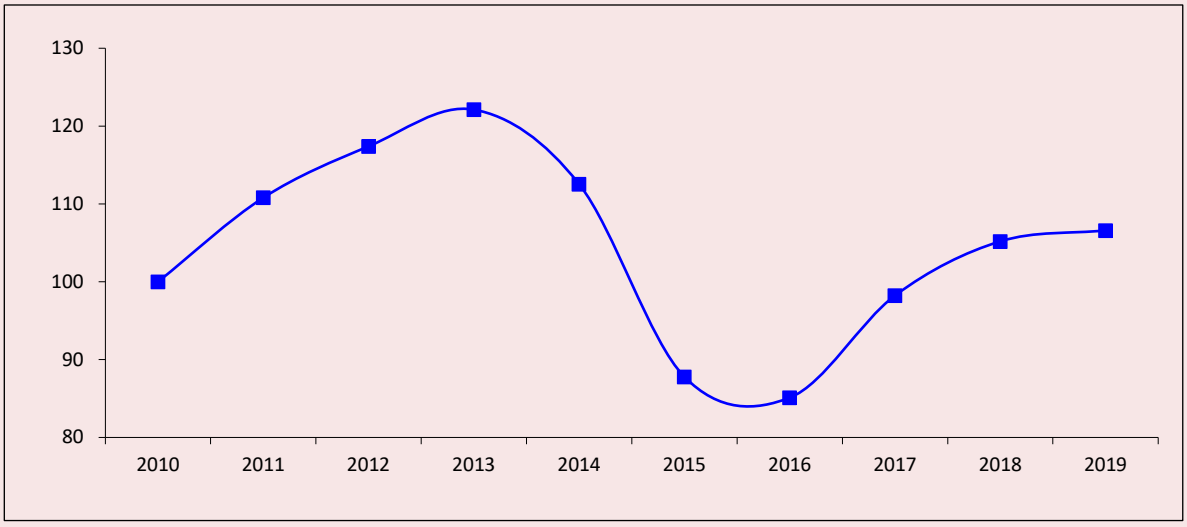
[6] According to: *Russian Statistical Yearbook: Stat. Coll.* Moscow: Rosstat, 2011–2020; *Indicators of Innovation Activity: stat. coll.* Moscow: National Research Institute "Higher School of Economics", 2011–2020.

Investment growth rate in renewal of the active part of fixed assets and R&D outpaced investment growth rate in fixed assets in general, so in these years, investment activity led to formation of factors for investment engineering development including those that contribute to exports growth. The effects achieved under the influence of factors formed by investments' growth in active part development of fixed assets, research and technological innovations can have a different length over time. The cost of machinery and equipment to increase and upgrade production capacity can increase output in the short term. The costs of research and development have a prolonged impact – the effects that manifest themselves in growing competitiveness of products can manifest themselves in 3–5 years depending on the available reserves.

Sharp drop in domestic market demand for investment vehicles in 2015–2016 (decline in demand was 30% compared to the level of 2012–2013) and slow growth in subsequent years *(Fig. 2)* led to a significant decrease in investment in fixed assets at enterprises that produce investment equipment. As the main part of investments is formed at the expense of the enterprises' own funds, the decrease in income negatively affected the investment activity.

In 2015–2019, there was a noticeable decline in investment activity in the investment engineering industries: investments' growth in fixed assets during this period amounted to only 105.0%, investments in machinery, equipment and vehicles increased slightly – their dynamics amounted to 118.3%, R&D costs dynamics was 100.4%, ZTI dynamics – 63.3%. These indicators of investment dynamics show that, in general, competitiveness growth in investment

Figure 2. Growth rate of domestic market demand for investment products, %, 2010 = 100%



Source: Russian Statistical Yearbook: Stat. Coll. Moscow: Rosstat, 2011–2020.

engineering can be achieved mainly due to the prolonged impact of investment activity factors in the previous period. However, we should remember that in the branches and industries of investment engineering, there are different investment dynamics in fixed assets and dynamics of qualitative changes in the structure of these investments; hence, a very significant difference in dynamics of competitiveness for individual types of products is possible. In general, in the investment of machinery industry, export revenue in 2015–2019 increased by 11% compared to the previous period. Export revenue for hydraulic turbines doubled, for engines and power plants – by 71%, for lifting and transport equipment – by 67%, for freight cars – by 50%. At the same time, for certain types of high-tech, expensive investment equipment, there was a significant decrease in export revenue: for processing centers – by 2.7 times, for lathes – by 1.6 times, for tractors for agriculture and forestry – by 1.5 times.

We have selected types of products for assessing competitiveness according to the main nomenclature groups of investment equipment[7]. From each group, the types of products (according to four-digit code) that meet the criteria of complex, high-tech, expensive types of investment equipment and are provided with statistical data for calculating the effects indicators are identified. For example, from the group of agricultural machinery, tractors for agriculture and forestry are included in the study, but combine harvesters are not included, as the lack of natural export indicators does not allow calculating unit prices. In the structure of exports of investment equipment, the share of products included in the study in 2010–2014 it was 24%, in 2015–2019 – 30%. Thus, exports growth is mainly due to an increase in the volume of deliveries of complex, high-tech, expensive types of investment equipment.

[7] Classification of nomenclature groups corresponds to the Foreign Trade Customs Statistics of the Russian Federation.

Quantitative characteristics of foreign trade activity, as a rule, have a high degree of instability in the annual dynamics of volumes, both in value and in kind. This is due to the fact that: (1) groups formed by four-digit codes include products of different values, so more or less expensive types may prevail in different years; (2) export contracts may begin or end which also determines the volume of annual deliveries; (3) dynamics of world prices of foreign trade may also affect the value indicators of exports. Therefore, the effects of foreign trade activities of Russian manufacturers of investment equipment are presented by quantitative and structural indicators in the average annual rate for each of the two analyzed periods. The comparison allows assessing qualitative shifts in the export indicators of investment equipment which correspond to the shifts in its competitiveness.

The indicators, included in the effects matrix, make it possible to assess export structure quality and its changes over time. *Export revenue* is estimated by the value indicators of exports of this type of product at current prices. *The specific weight of this equipment type in export structure of the enlarged group* (lathes in the group of metalworking equipment or tractors in the group of machines for agriculture) *is taken into account*. For example, this indicator for lathes is calculated as the ratio of export revenue for lathes to the total export revenue for a group of metalworking equipment. The growth of the indicator indicates an increase in the share of expensive, high-tech equipment. *Unit export prices* show changes in the technological competitiveness of exported products. Of course, the unit prices of exports may be affected by instability of prices on the world market of these products, but this influence can not be strong and long-term. The ratio of the types of products that are included in the four-digit group has a decisive impact. The decline in this indicator indicates a decrease in the export of expensive products that have high competitiveness in terms of technological indicators. *The ratio of unit export and import prices* characterizes the ratio of price characteristics in foreign trade activities. A significant excess of specific export prices over specific import prices indicates that the exported equipment is knowledge-intensive, technically complex and expensive, and simple, relatively inexpensive equipment prevails in imports.

Assessment of investment equipment competitiveness by export performance indicators

The growth of competitiveness indicators is observed for most types of investment equipment included in this study. Exports, estimated by the value of export revenue, and the unit export price increased. This indicates an increase in the share of technically complex, expensive equipment in the total volume of exports for this type of equipment within the nomenclature group by four-digit codes. In some cases, a decrease in the unit export price is accompanied by an increase in export revenue and the share of this equipment in the total volume of exports for the corresponding group of equipment, for example, exports of forging and pressing equipment *(Tab. 1)*.

The decline in competitiveness indicators is most typical for certain types of metalworking equipment and tractors. A significant decrease in export volumes is observed in the group of processing centers. At the same time, in 2015–2019, there was a high increase in specific export prices. Consequently, domestic manufacturers carried out an exclusive production of very complex and expensive equipment during this period. But this has only happened twice: in 2015, more than 1 million dollars worth of equipment was delivered to China, and in 2017, about 2 million dollars worth of equipment was delivered to Saudi Arabia.

Table 1. Matrix of effects by types of investment products (In terms of exports to non-CIS countries)

Type of investment equipment	Development factors	Foreign trade activity effects on an average annual basis			
	Index of qualitative changes in technological structure I^{Tstr} %	Export revenue, mil. doll.	Specific weight of the type of equipment in the export structure of the enlarged group, %	Unit export prices, thou. doll.	Ratio of unit export and import prices, times
Hydraulic turbines	2010–2014 100.1	8.8	10.8	34.4	2.0
	2015–2019 102.0	17.6	14.9	25.1	1.2
Engines and power plants	2010–2014 98.1	184.5	11.1	81.3	4.7
	2015–2019 103.1	315.7	13.6	124.4	8.2
Processing centers	2010–2014 96.5	2.7	2.2	93.4	0.7
	2015–2019 55.3	1.0	1.1	276.2	1.5
Turning machines	2010–2014 98.3	6.1	4.9	47.9	1.3
	2015–2019 43.0	3.9	4.4	46.0	1.2
Forging and pressing equipment	2010–2014 113.7	21.8	17.4	50.2	6.5
	2015–2019 102.1	23.5	26.4	47.9	10.9
Tractors for agriculture and forestry	2010–2014 96.3	53.7	69.2	52.7	1.7
	2010–2014 198.6	36.5	48.0	21.3	1.2
Lifting and transport equipment	2010–2014 102.1	20.9	8.8	216.9	5.4
	2015–2019 101.3	34.7	14.9	178.8	6.1
Bulldozers	2010–2014 100.2	36.8	15.6	164.7	2.1
	2015–2019 118.6	24.5	10.6	77.2	0.9
Railway locomotives	2010–2014 124.3	37.3	17.6	1370.0	6.4
	2015–2019 75.6	27.8	14.9	875.3	5.5
Freight stocks	2010–2014 111.3	35.8	16.9	44.7	1.5
	2015–2019 104.6	53.6	28.7	35.6	2.0

Source: *Foreign Trade Customs Statistics of the Russian Federation. Annual Collection.* Moscow: Federal Customs Service of RF, 2010–2019.

The production of such complex and expensive equipment indicates high competitiveness of certain types of products, but this is not enough to ensure export growth. Other equipment that is in high demand on the world market should also be competitive.

Machine tool construction is a strategically important industry for economic development [19]. In countries with a developed machine tool industry, the share of exports in the output structure of these products is more than 29% which exceeds the same indicator for the automotive industry [6]. A decrease in export of such equipment indicates a decrease in competitiveness, and possibly production termination. The recovery of exports of metalworking equipment is complicated by the fact that it is included in the lists of dual-use products. "This means that a transaction with a foreign buyer turns into a complex procedure for passing export control" [20, p. 59].

Export volume of tractors for agriculture and forestry has significantly decreased. Other indicators, such as the unit price of exports, have also decreased. In this case, decline in competitiveness is most likely the result of a significant and prolonged underfunding of industry technical and technological renewal which did not make it possible to increase production volume of competitive products. In 2015–2019, domestic market demand for tractors increased significantly: the growth of supplies to the domestic market was 139%[8], growth of imports – 119%[9], while the capacity utilization rate was 13.8%[10] (in the previous period – 27.4%). The extremely low utilization of existing production capacities with increase in demand indicates an extremely low rate of production equipment updating and introduction of advanced technologies. However, the prolonged impact of the growth of industry costs on the technological renewal of production equipment in 2015–2019 allows predicting an increase in tractor exports in 2020–2024.

A similar situation has developed with regard to bulldozers: unit export prices have halved, while capacity utilization has decreased from 38 to 19%. The results are quite different in the sectors where high investment activity was observed in 2010–2014, for example, in railway engineering. Particularly significant is the export of freight stocks which was small in volume and was mainly limited to deliveries to Eastern European countries and Mongolia. In 2015–2019, exports increased by 1.5 times, mainly due to the expansion of its geography. Export growth is provided by growth of technological competitiveness [21].

Assessment of investment equipment competitiveness for export to foreign markets

Division of non-CIS markets into main and growing ones *(Tab. 2)* conducted according to the following indicators: (1) group of main markets includes importing countries, Russian exports of investment equipment to which have been stable over the past decades, exceeding 1% of the total export of investment equipment; (2) group of growing markets consists of importing countries, Russian exports of investment equipment to which have been increasing over the previous 10 years. Group of main markets includes 11 countries including the largest importers of Russian investment equipment: China – 17.7% of total exports of investment equipment, India – 8.9%, Germany – 7.5%, the United States – 4.3%.

[8] According to: data of f. P-1 of Rosstat of the Russian Federation, 2010–2019.

[9] According to: Foreign Trade Customs Statistics of the Russian Federation. Annual collection. Moscow: Federal Customs Services of RF, 2010–2019.

[10] According to: *Industrial Production in Russia: Stat. Coll.* Rosstat. 2016–2019.

Table 2. Structure of export of investment equipment to non-CIS countries, %

Type of investment equipment	Periods of investment activity	Distribution of investment equipment exports to non-CIS markets				Reference
		Total	Main markets	Growing markets	Other markets	export dynamics 2019–2015 to 2010–2014
Hydraulic turbines	2010–2014	100	0.0	84.2	15.8	202.3
	2015–2019	100	3.4	82.9	13.7	
Engines and power plants	2010–2014	100	85.2	4.0	10.8	170.9
	2015–2019	100	91.5	4.4	4.1	
Processing centers	2010–2014	100	6.8	1.8	91.4	37.0
	2015–2019	100	45.5	16.2	38.6 .	
Turning machines	2010–2014	100	28.7	29.2	42.1	63.9
	2015–2019	100	17.7	30.2	52.1	
Forging and pressing equipment	2010–2014	100	32.3	29.2	38.5	107.8
	2015–2019	100	35.8	45.0	19.2	
Tractors for agriculture and forestry	2010–2014	100	27.4	29.1	43.5	68.0
	2015–2019	100	26.7	45.0	28.3	
Lifting and transport equipment	2010–2014	100	19.2	36.3	54.5	166.0
	2015–2019	100	26.4	57.2	16.4	
Bulldozers	2010–2014	100	22.5	42.7	34.8	66.6
	2015–2019	100	31.8	48.4	19.8	
Railway locomotives	2010–2014	100	0.0	87.7	12.3	74.5
	2015–2019	100	0.5	85.1	15.4	
Freight stocks	2010–2014	100	0.9	13.6	85.5	149.7
	2015–2019	100	9.4	50.1	40.5	

Source: *Foreign Trade Customs Statistics of the Russian Federation. Annual Collection*. Moscow: Federal Customs Services of RF, 2010–2019 гг.

Group of growing markets consists of importing countries, export of investment equipment to which increased significantly in 2015–2019 compared to the previous period. The largest and most stable importers of Russian investment equipment are Belgium, Vietnam, Great Britain, Egypt, Iran, Italy, Cuba, Netherlands, and Finland. A total of 20 countries are included in this group.

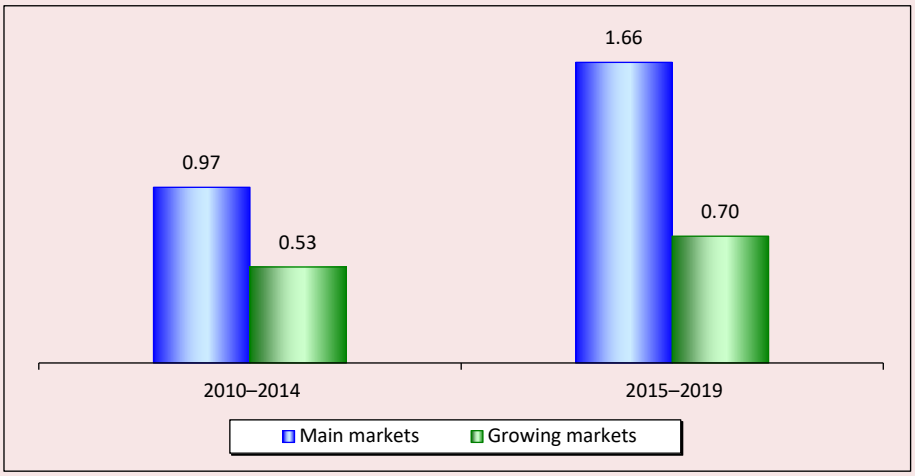
The highest export growth occurred in the group of hydraulic turbines (see Tab. 2). The growth was mainly driven by demand from the growing markets of Cuba, Serbia, Turkey and Ecuador.

The decline in bulldozer exports came at the expense of markets that are not among permanent and growing ones. Regular importers of this type of construction equipment increased their purchases in 2015–2019. In the main markets, the permanent importers of bulldozers are Germany and Poland, in growing markets – Belgium, Vietnam, Spain, the Republic of Korea, Mongolia, Netherlands and Turkey.

Growth of freight stock exports is due to the main (traditional importers of the former socialist camp countries – Bulgaria, Poland, the Czech Republic and Slovakia) and mainly growing markets (mainly the markets of Iran and Cuba).

Distribution of exports of investment equipment by types of products included in the study in the group of competitive products (see Tab. 1 and 2), between main and growing markets is shown in *Figure 3*. There is a fairly high growth in demand: in 2015–2019, demand of the main markets increased by 71%, growing – by 32%.

Figure 3. Export revenue for group of competitive investment vehicles in main and growing markets, bil. doll.



Source: *Foreign Trade Customs Statistics of the Russian Federation. Annual Collection.* Moscow: Federal Customs Service of Russia, 2010–2019.

Demand stability. We estimate this indicator based on constant annual deliveries over the entire period 2010–2019. The most stable demand is typical for the group "Engines and power plants". The annual demand for this equipment is presented by 10 countries that are a part of the group of main markets: the largest importers are the United States, Germany and India. In the group of growing markets, 9 countries are permanent importers including the largest deliveries to Belgium, the United Kingdom, Vietnam, Italy, the Republic of Korea, Cuba and the United Arab Emirates.

In the markets of metalworking equipment, forging and pressing equipment is in steady demand. In the main markets, the largest importers in this area are China, India, Germany, the United States and the Czech Republic, while the growing ones are the Republic of Korea, Italy, the United Kingdom, Iran and Turkey.

The most regular and largest deliveries of tractors for agriculture and forestry are made to Germany and Poland, as well as to the countries that are a part of group of growing markets: Cuba, the Netherlands, Belgium, Vietnam and Mongolia.

The largest and permanent importers of construction equipment in the main markets are Germany, India, the United States, while Belgium, Vietnam, Mongolia, the United Arab Emirates and Turkey are the growing ones.

Investment activity as a factor of increasing investment equipment competitiveness

The basis for the construction of forecast options for growing competitiveness of investment engineering products is based on the quantitative estimates of effectiveness of investment activities as a result of the analysis, showing export growth rate of competitive types of investment equipment, as well as dynamics of specific export prices reflecting structural shifts toward an increase in expensive types of equipment. Two types of forecast options are proposed: (1) investment-active which assumes a significant increase in knowledge-intensive investments and investments in the renewal of

the active part of fixed assets; (2) conservative, maintaining the growth rate of the previous period. In the investment-active variant, the effects will be formed by combining the prolonged impact of investments of the previous period and activation of knowledge-intensive and technical-technological factors – the result of growth of knowledge-intensive investments in the current period. The conservative version of the forecast assumes the preservation of a low level of investment in the renewal of the active part of fixed assets in the forecast period [22]. In this case, the export-oriented production of investment equipment will take place under the conditions of weakening effects of the prolonged impact of investments of the base period.

There we should note that in 2020, the economy including exports faced the challenges associated with the coronavirus pandemic. However, the measures taken in the Russian Federation [12] suggest that the dynamics of recovery and further development will be sustainable.

When constructing *investment-active version of the forecast*, we proceed from high investment growth rates ("real investment growth of in fixed assets is at least 70% compared to the indicator of 2020"[11]) and assume an increase in state participation in implementation of measures aimed at accelerated development of machine-building industries that produce investment equipment. At the same time, high dynamics of export indicators of machine-building products should be ensured already in the medium term and a significant increase in growth rates should occur in 2026–2030 *(Tab. 3)*. The projected export growth rates in 2021–2025 are due to the expansion of markets, but the main factor remains high

Table 3. Export of investment engineering products to non-CIS countries, %

Type of investment equipment	Forecast indicators	Base period growth rate*		Growth rates for the forecast period*			
		2010–2014	2015–2019	Investment-active option		Conservative or inertial option	
				2021–2025	2026–2030	2021–2025	2026–2030
Investment equipment – total	Investment in machinery and equipment	164.3	118.3	150.0	140.0	120.0	130.0
	Export**	141.1	105.2	164.0	122.0	115.0	125.0
Hydraulic turbines	Investment in machinery and equipment	7.6	21.2	130.0	140.0	110.0	120.0
	Export	70.2	199.2	140.0	150.0	115.0	120.0
	Unit export prices	191.2	82.5	120.0	140.0	105.0	110.0
Engines and power plants	Investment in machinery and equipment	240.0	110.7	150.0	140.0	120.0	115.0
	Export	133.5	135.4	140.0	150.0	130.0	130.0
	Unit export prices	132.1	153.4	150.0	160.0	130.0	135.0
Processing centers	Investment in machinery and equipment	102.3	79.1	150.0	160.0	115.0	115.0
	Export	197.3	40.2	120.0	140.0	105.0	110.0
	Unit export prices	91.3	168.1	190.0	195.0	100.0	110.0

[11] On the National Development Goals of the Russian Federation for the period through to 2030: Presidential Decree of the Russian Federation no. 474, dated July 21, 2020. ConsultantPlus. Available at: www/consultant.ru/document/cons_doc_LAW_350638/

End of Table 3

Type of investment equipment	Forecast indicators	Base period growth rate*		Growth rates for the forecast period*			
		2010–2014	2015–2019	Investment-active option		Conservative or inertial option	
				2021–2025	2026–2030	2021–2025	2026–2030
Turning machines	Investment in machinery and equipment	407.9	147.6	150.0	180.0	120.0	125.0
	Export	180.8	88.9	130.0	150.0	105.0	110.0
	Unit export prices	123.0	106.5	130.0	190.0	105.0	105.0
Forging and pressing equipment	Investment in machinery and equipment	174.3	37.7	150.0	170.0	120.0	125.0
	Export	119.6	93.0	120.0	140.0	105.0	105.0
	Unit export prices	59.7	57.4	150.0	150.0	99.8	99.5
Tractors for agriculture and forestry	Investment in machinery and equipment	52.0	363.1	130.0	160.0	115.0	110.0
	Export	53.7	68.0	120.0	130.0	105.5	100.5
	Unit export prices	93.7	45.9	130.0	140.0	90.0	90.0
Lifting and transport equipment	Investment in machinery and equipment	68.3	139.8	130.0	150.0	120.0	110.0
	Export	50.8	166.3	115.0	130.0	110.0	110.0
	Unit export prices	118.5	82.4	120.0	130.0	110.0	105.0
Bulldozers	Investment in machinery and equipment	173.1	158.3	150.0	150.0	120.0	125.0
	Export	104.0	66.5	125.0	130.0	115.0	110.0
	Unit export prices	101.7	46.9	120.0	120.0	110.0	105.0
Railway locomotives	Investment in machinery and equipment	636.3	55.0	200.0	150.0	130.0	120.0
	Export	454.5	74.6	150.0	150.0	120.0	110.0
	Unit export prices	340.9	63.9	110.0	115.0	100.0	105.0
Freight stocks	Investment in machinery and equipment	175.4	54.4	150.0	150.0	120.0	110.0
	Export	133.2	149.8	120.0	120.0	110.0	105.0
	Unit export prices	166.6	103.0	115.0	115.0	105.,0	105.0

* Growth rate is calculated as an increase in the indicator in the final year in relation to the initial year of the period.
** Export forecast is given in growth rate terms of export revenue.
According to: data f. P-2 Rosstat of RF, 2010–2019; *Foreign Trade Customs Statistics of the Russian Federation. Annual Collection*, vol. 14. Moscow: Federal Customs Service of RF, 2010–2019.

competitiveness of domestic investment equipment (both price and technological) which can be achieved with investment activity growth in the investment engineering industries. A prerequisite for competitiveness growth is a high innovation and technological saturation of investments.

In the long term (2026–2030), in the absence of force majeure, we can expect a significant increase in investment activity including an increase in the innovation and technological saturation of investments with priority for research and development costs. To ensure competitiveness growth of domestic equipment and create conditions for export growth, it is necessary to restore the steady growth of knowledge-intensive investments in industries that produce domestic investment equipment based on advanced research and development. It is necessary to ensure a significant

increase in the costs of research and development [23] and production equipment renewal the decline of which in most industries has continued over the previous years. At the same time, a steady flow of investment equipment production can be provided only in the conditions of completing it with high-quality electronics and devices [24; 25]. Growth of knowledge-intensive investments will allow expanding investment equipment range that has technological competitiveness in the global market.

Conclusion

The developed author's approach, based on relationship assessment between the qualitative changes in the technological structure of investments in fixed assets of the sub-branches of mechanical engineering that produce investment equipment, and dynamics of investment equipment export to the most inaccessible markets: the markets of far abroad, has shown its effectiveness for predictive and analytical research in order to develop forecasts for developing investment engineering and export diversification of the Russian Federation.

The conducted research shows that the existing and applied tools in the Russian Federation allow ensuring the positive dynamics of factors affecting competitiveness of mechanical engineering and its products. At the same time, investment equipment export to foreign countries is a leading indicator of its competitiveness. And the very fact of exporting machine-building products is, in view of the relatively low domestic demand, a necessary condition for the functioning of key machine-building enterprises, utilization of their production capacities. However, the resources that determine the impact of these tools are still insufficient.

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Russian Tourism during the COVID-19: Assessing Effect of Stimulating Domestic Demand for the Country and Regions' Economy*

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Abstract. The COVID-19 pandemic has struck the tourism industry all over the world significantly reducing industry's revenue and number of jobs. It has had a negative impact on the global economy. In Russia, the tourism sector was one of the most affected areas due to the quarantine restrictions that made the government take several supporting measures to mitigate the coronavirus effects and restore demand for tourist services. It actualizes the problem of assessing economic effects after stimulating consumption of tourism goods and services, as well as identifying and justifying the development directions of Russian tourism in un ntific novelty of the research is to determine, on the basis of inter-sectoral modeling, the effect for the Russian economy from the implementation of the program of subsidizing domestic tourist trips – so-called tourist cashback. The results of the study have identified the importance of stimulating population's demand for recreation within the country for economy and have found the territorial disparity problem in the distribution of the increase in gross output caused by Russian tourist's consumption growth. As for the research methodological base, the author uses general scientific methods of analysis, synthesis, comparison, generalization, and tools based on input-output analysis methodology. Information base includes the works of domestic and foreign scientists dealing with tourism development problems in the post-crisis period, the assessment of its impact on economic parameters, as well as

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information from state statistics authorities, data from the World Bank, the World Tourism Organization, and the Russian Public Opinion Research Center. The prospects for future studies are related to designing regional tourism development areas that contribute to the increase in population's consumption volume of tourist products and growing competitiveness of the latter.

Key words: tourism, cashback, COVID-19, economy, input-output analysis, domestic consumer demand.

Introduction

In 2020, the coronavirus pandemic had a negative impact on the global economy and most of its industries. According to the UN estimates, a 4.3%[1] production decline was a result of the corona-crisis that is comparable to the economic losses of the Great Depression in 1929–1939. Tourism is one of the most affected sectors. It occupies an important place in the world economy, and it is one of its drivers. Before the introduction of travel restrictions by countries due to the spread of COVID-19, according to the World Tourism Organization at the United Nations (UNWTO), tourism contribution to the world GDP exceeded 10.3%, forming a third of the world's exports of services and creating every tenth job in the world (330 million jobs). In the ten years before 2020, there was an annual increase in tourist arrivals which indicates the dynamic industry development. As a result of the crisis, this figure decreased by 74%. As a result, the UNWTO called 2020 the worst year for the industry on record. The loss of income in the tourism sector is 11 times higher than in 2009 (during the global economic crisis).

Russia is one of the countries with significant potential for development and strengthening of its role in the economy. Currently, it is inferior to the world developed countries in terms of the amount of added value created by tourism per capita[2]. The country has opportunities to significantly increase the flow of international and domestic tourists. In recent years, industry development has received increased attention from the authorities. This indicates that, in medium term, tourism is seen as a promising driver of economic growth stimulating domestic demand.

The losses, incurred by Russian tourism industry as a result of the negative impact of the coronavirus pandemic, are estimated at 1.5 trillion rubles, with an annual turnover of 3.7 trillion rubles in the pre-crisis period[3]. To deal with the crisis consequences, the governments of many world countries have taken measures to support the economy in general and tourism in particular. For instance, in Russia, at the height of the pandemic, for the first time, there was implemented a program of subsidizing domestic tourist trips, the so-called cashback as a measure to stimulate citizens' demand for tourist services within the country. Summarizing the authors' works, it is possible to conclude that the issues related to the evaluation of the support programs provided to the tourism industry are poorly developed in scientific publications. In the studies, devoted to the problems of the Russian tourism sector, its development possibilities in the context of the pandemic are not fully disclosed.

[1] Data of the UN report about world economic situation and development prospects. Available at: https://www.un.org/development/desa/dpad/publication/world-economic-situation-and-prospects-2020/ (accessed: February 10, 2021).

[2] Strategy for Tourism Development in Russia until 2035: approved by the Government Decree of the Russian Federation no. 2129-r, dated September 20, 2019.

[3] Federal Tourism Agency revealed industry losses due to the pandemic and lack of tourists. Available at: https://www.rbc.ru/society/19/10/2020/5f8de4329a7947c66bdf1521 (accessed: February 10, 2021).

Thus, it is rather relevant to determine the prospects for tourism development in the country taking into account new realities. The particular research interest is the assessment of the measures' effectiveness taken to increase population's demand for goods and services of the tourism industry. In this regard, the purpose of the research is to assess the effect on the economy of stimulating consumption of goods and services produced by the tourism sector, to identify and justify directions of Russian tourism development in the conditions of an unfavorable epidemiological situation and global economic turbulence. Its solution required consideration of trends in development of Russian tourism sector, its regulation analysis at the present stage, calculation of the effects on the economy from state subsidies for domestic tourist trips and development of measures to restore industry. Information base is the works of domestic and foreign scientists dealing with economic growth issues, based on tourism development, as well as information from state statistics bodies, data from the World Bank, the World Tourism Organization. The study contains the calculation of the effect of cashback implementation based on the use of input-output analysis method which forms its scientific novelty, reveals the current trends in functioning of Russian tourism industry.

Theoretical aspects of the research

Many domestic and foreign authors, dealing with the tourism impact on the economy, have proved that it is a significant factor in the economic growth of the territory [1–8]. A review of the scientific research on this issue in recent years shows that scientists pay special attention to consideration of causal relationship between tourism and economic growth in the framework of testing the TLG (Tourism-Led Growth)[4] hypothesis and associated EDTG (Economic Driven Tourism Growth)[5] hypothesis. Thus, we have found that a 100% increase in the number of tourist arrivals, tourism income, and tourist expenses cause an increase in the GDP per capita by 9.7 and 10%, respectively. At the same time, the GDP per capita growth by 100% increases the number of arrivals, income, and expenses by 54.91 and 101%, respectively [7].

In case of China, the article determines that the TLG hypothesis is more valid for regions of the country with less developed economy [6]. Based on the use of quantile analysis, another research in the case of the ten largest destinations in the world proves the important tourism role in stimulating economic development of the countries [8]. A.V. Aistov and T.P. Nikolaeva determine the significance for the economy using World Bank data for a balanced panel of 116 countries for 1997–2017 [1]. The authors have found that changes in indicators reflecting industry development precede changes in the GDP per capita.

The work [2] in detail discusses the tourism impact on Russian regions' development. Based on regression analysis, the researchers have proved that the GRP growth largely depends on the size of the tourist flow.

The impact of the COVID-19 pandemic on the tourism industry has led to a high interest of scientists in assessing its consequences determining the prospects for the sector development in the post-COVID period, as well as changing population's behavior in relation to the consumption of tourist products. For example, on the basis of a longitudinal study, the works of the University of Washington [9] concluded that the increased needs of tourists in the field of public safety will accelerate the introduction of developments in the field of artificial intelligence and robotics in the tourism industry. The studies of the English University of Gloucestershire [10]

[4] The TLG hypothesis implies a link between tourism as a specific type of export and economic growth in the short and long term.

[5] The EDTG hypothesis means that the economic growth is provided not only by increase in the volume of labor and capital, but also by expansion of exports including tourism.

consider the corona-crisis' impact on tourism from the sustainability standpoint: after the pandemic, popularity of package holidays will fall due to restrictions on air travel that, in turn, will increase the demand for travel within countries' borders. A team of Malaysian scientists evaluated the impact of COVID-19 on the Chinese tourism industry [11] determining that the Chinese tourism industry was seriously affected by the coronavirus. At the same time, they attribute the positive effects of the pandemic to growing popularity of the services of tourism enterprises provided online.

Russian researchers turned to the analysis of tourism sector adaptation to the difficult socio-economic conditions of Russia's development [12], the assessment of the income lost in 2020 by tourism enterprises [13], the forecast of the travelers' demand for tours in the post-crisis period [14].

Thus, it is worth noting that, in scientific publications, the assessment of the effects on the economy from the adoption of measures to stimulate demand for tourism goods and services is studied insufficiently. Closing this gap will allow deepening and expanding research on the relationship between tourism and economic growth.

In a separate group, it is necessary to highlight the works of the scientists who consider the state and prospects of industry functioning in Russia. In particular, they have recently focused on issues related to the definition of strategic directions for Russian tourism development [15; 16], the study of institutions for managing the tourism industry [17], and improving its competitiveness [18] including on the basis of tourist technology platforms [19]. However, the current vector of tourism development in the country should be determined taking into account the assessment of implemented measures to support the industry which actualizes this research.

Research methodology

To analyze the state of the tourism industry, to diagnose its problems, and justify the directions of its further development, the research uses general scientific methods of analysis, synthesis, comparison, and generalization. The effect on the economy from the program realization of subsidizing domestic tourist trips was estimated using the method of input-output analysis which makes it possible to conduct scenario-based input-output economic analysis. As a forecasting tool, we have used an input-output model based on the main equation of the input-output analysis that is the following in the matrix form:

$$x = Ax + y, \quad (1)$$

where: x – total production output vector; A – matrix of direct cost coefficients; y – final product vector.

In the simulation, we use the following equation:

$$(E - A)^{-1} \cdot y = x, \quad (2)$$

where: E – unit matrix; $(E - A)^{-1}$ – matrix of total cost coefficients.

The model contains the type of "Tourism" activity included in it which is not separately presented in Russian statistics that allow giving an objective assessment of the impact of tourist product value on the structural economic elements, as well as to assess the consequences of stimulating demand for tourist services which distinguishes our study from the work of other scientists.

To calculate the tourist output and tourist value added by types of activities related to tourism, we use the methodological tools, based on the aggregation of data characterizing the shipment of goods, performance of works, and provision of services by Russian enterprises [20].

According to data of the Federal Tourism Agency on the implementation of the tourist cashback program, the research calculates the volume of sales of tourist products with an increase in final demand on the basis of the input-output model. The authors also have assessed tourism contribution to the additional increase in the number of employees and salary fund.

The paper carries out the assessment of the territorial effects in the Russian Federation and its federal districts in the proportions of the output structure, the number of employees, and the wage fund. These territorial effects arise when stimulating the demand for goods and services in the cashback volume.

Main research results

Trends of the tourism industry development in the Russian Federation

The tourism role in the Russian economy is significantly lower than the global average *(Tab. 1)*. In terms of tourism revenue in 2019, the country ranked 25th in the world with an indicator of 20 billion dollars which is almost 28.5 times less than the absolute leader – the United States. At the same time, rapid growth of the tourism industry in China was noteworthy in 2000–2019; its contribution to the GDP increased by 6 times which is caused by a serious approach to its development on the part of the state. Moreover, the Chinese authorities pay special attention to increasing domestic consumption in the tourism sector.

For instance, since 1999, the "Golden Week" system has been introduced in the People's Republic of China, aimed at expanding consumer demand including tourist services. As a result, this time interval has become perceived by society as "tourism during the Golden Week" [21]. In addition, since that moment, the country's leadership has consistently adopted a number of legislative measures, aimed at active development of domestic tourism which has consolidated its economic significance. It is worth noting that, according to the Ministry of Culture and Tourism of the People's Republic of China, in 2020, 637 million Chinese people traveled within the country during the Golden Week (80% of the level of 2019). At the same time, the volume of tourism revenues for the holiday week amounted to 68.6 billion US dollars which corresponded to 70% compared to last year[6].

Russia has a significant potential for the consumption of tourism goods and services by population within the country. According to the surveys, conducted by the All-Russian Center for

Table 1. Direct tourism contribution to the world countries' GDP in terms of tourism incomes, bil. US doll (at current prices)

No.	Country	2000	2010	2015	2018	2019	Changes in 2000–2019, %
1.	USA	442	422	510	555	571	129.2
2.	China	69	145	283	382	407	by 6 times
3.	Germany	136	129	132	139	142	104.4
4.	Japan	131	104	109	119	121	92.4
5.	Italy	107	80	108	117	119	111.2
6.	France	97	90	103	109	112	115.5
7.	India	39	55	78	96	105	by 2.7 times
8.	Great Britain	102	77	94	105	107	104.9
9.	Mexico	67	77	91	98	100	149.3
10.	Spain	59	60	68	78	81	137.3
Reference: Russia		***14***	***19***	***19***	***19***	***20***	***142.8***

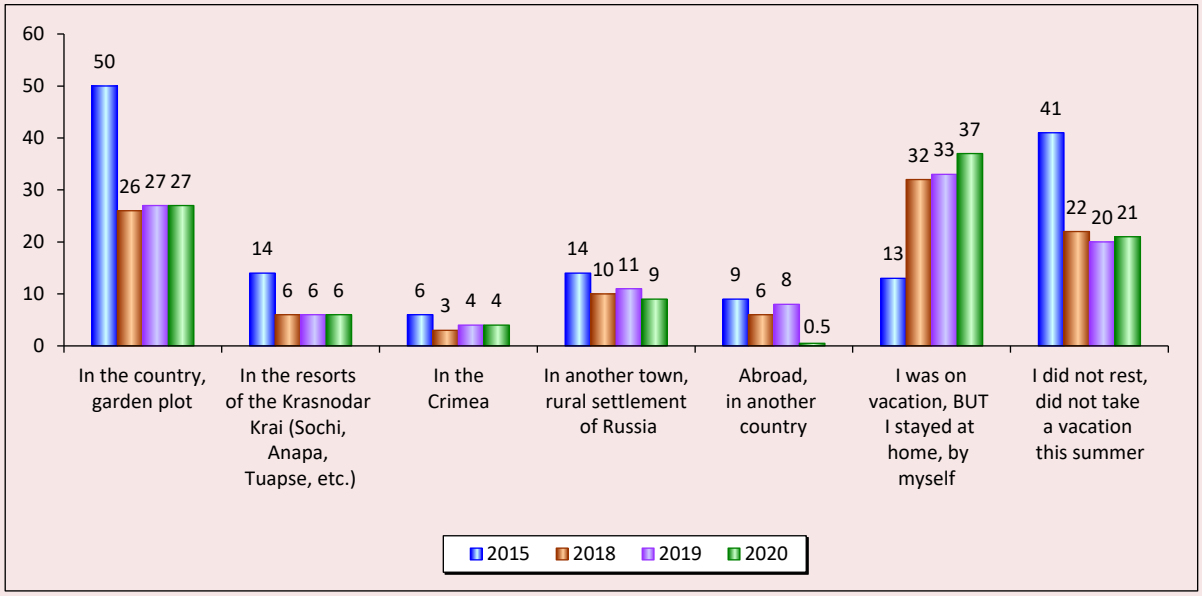
Source: data of the World Tourist Organization (UNWTO).

[6] "The Golden Week" Experience in China: mass tourism failed to fight the coronavirus outbreak. Available at: https://www.atorus.ru/news/press-centre/new/52981.html (accessed: February 10, 2021).

the Study of Public Opinion, the share of those who spend their summer holidays at home or in the country has not changed significantly over the previous five years (in 2015 – 63%, in 2020 – 64%; *Fig. 1*).

Population's under-consumption of domestic tourism services is caused by a lack of financial resources for travel. In 2020, this reason surpassed in popularity the answer explaining the inability to travel due to the coronavirus and related restrictive measures *(Tab. 2)*. Based on the results of the surveys, the pandemic did not significantly affect the structure of summer holidays of Russians, since the number of vacationers in the main resorts of the country (Krasnodar Krai and the Crimean Peninsula) remained at the level of previous years.

Figure 1. Distribution of Russians' answers regarding vacation (any number of answers), % of the number of respondents



Source: Tourist summer results – 2020. VCIOM. Available at: https://wciom.ru/fileadmin/file/reports_conferences/2020/2020-09-29_itogi_leta.pdf (accessed: February 10, 2021).

Table 2. Distribution of answers to the question "If you stay at home this summer and do not go anywhere, what is the reason?" (open question, one answer), % of those who will spend summer at home (top answers)

Possible answer	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
No money, lack of funds	57	54	49	47	49	43	44	44	44	53	36
Coronavirus / epidemic / self-isolation / everything is closed	-	-	-	-	-	-	-	-	-	-	25
Family affairs, a baby / parental leave	6	6	8	7	8	7	4	12	18	15	7
Work, no vacation, vacation at another time of the year	6	11	12	12	11	15	17	17	15	14	6
Health state, illnesses (own or relatives'), age	10	12	13	10	14	13	13	8	12	10	7

Source: Summer plans – 2020: house, dacha and domestic tourism. *VCIOM*. Available at: https://wciom.ru/index.php?id=236&uid=10297 (accessed: June 21, 2020).

We should note that the reason for the situation, when citizens do not use the potential of the country's tourism resources, is also the state's approach to its development.

Having traced the evolution of the state management of the tourism industry in Russia from the post-Soviet period to the present, we can conclude that tourism has not been perceived by the authorities as an independent object of regulation and a promising high-yield branch of the economy for a long time. This is indicated by a frequent change of its supervising structures responsible for development of healthcare, culture, sports, and youth policy implementation.

2019–2020 may be considered the beginning of fundamental changes in Russian tourism regulation: the industry received a qualitatively new level of support from the state. For instance, in 2019, a Strategy for Tourism Development in the Russian Federation until 2035 was approved, which focuses on economic importance of the sector. Aimed at stimulating demand and increasing availability of the Russian tourist product in the domestic and foreign markets, the strategy is distinguished by the specifics in identifying the pressing tourism problems and determining the priority directions for Russian tourism industry development taking into account the experience in this area. The document presents quite ambitious goals including the increase of tourism contribution to the country's GDP by 5.1 times compared to the 2017 level. Meanwhile, the achievement of these indicators remains in question, as there are still no plans to implement the strategy.

In 2020, the Federal Tourism Agency was transferred from the jurisdiction of the Ministry of Economic Development of the Russian Federation to the direct government subordination which expanded the powers of the structure in terms of developing state policy in the field of tourism, as well as coordinating the implementation of its priorities.

During the same period, in addition to the 12 existing national projects, Russian President Vladimir V. Putin initiated the creation of a new national project "Tourism and the Hospitality Industry". It aimed at creating high-quality and diverse tourist products throughout the country, increasing availability of tourist products and improving management in the tourism sector. The project is expected to start by the summer of 2021, and its validity period is calculated through to 2030. The total funding amount is planned to be 3.16 trillion rubles. 70% of the total amount is from extra-budgetary sources, and the remaining part is at the expense of the state funds.

A new development institute, the state corporation "Tourism.RF", created at the end of 2020, will be responsible for implementation of the national project. The structure functions include master planning of the country's territory, development of tourist infrastructure and activation of public-private partnership in the field of tourism.

Thus, aforementioned things suggest that, by 2020, the Russian tourism industry, classified by the government as one of the most affected sectors of the national economy, for the first time at the present stage of its development, was recognized by the authorities as one of the economic priorities including a direction to stimulate consumer demand. According to the leading economists of the Institute of Economic Forecasting of RAS, which is developing directions for post-crisis economic recovery, the intensification of domestic demand can ensure its growth rate up to 3.5%[7] by the end of 2021.

Scientific studies have established that tourism, which includes transport services, hotel services, activities of public catering enterprises, commu-

[7] Shirov A.A. How will growth be restored. *Vedomosti*, December 30, 2020. Available at: https://www.vedomosti.ru/opinion/articles/2020/12/29/853008-vosstanavlivatsya-rost (accessed: February 16, 2021).

nication organizations, cultural and leisure institutions, can be considered a catalyst for consumer demand from general population, as well as influence regional inequality reduction [22]. Among the measures to support the demand for domestic tourism, some states have developed programs to subsidize domestic travel. For example, in Thailand and Russia, the promotion of domestic tourist traffic was carried out through cashback. The Thai government has compensated hotel owners up to 40% of the cost of rooms booked by domestic tourists. In Russia, a part of the cost of buying tours within the country and booking tickets was returned to the population through the MIR payment system. For these purposes, the government has allocated 15 billion rubles. The program was implemented in two stages in 2020:

– August 21–28 (depending on the cost of the tour, 5–15 thousand rubles were returned to a tourist);

– October 15–December 5 (a tourist was refunded 20% of the cost of traveling around the country, but not exceeding 20 thousand rubles).

The results of this unprecedented campaign for Russian tourism should be evaluated and interpreted.

Assessment of cashback implementation effect

According to the Federal Tourism Agency, in 2020, Russians purchased a total of 6.5 billion rubles worth of tours during the first and second sales windows of which about 1.2 billion rubles8 were returned to tourists. In general, nearly 300 thousand people took part in the initiative.

The use of input-output modeling allowed calculating the effect on the country's economy with:

– consumption of tourist services in the amount of 6.5 billion rubles;

– additional consumption of goods and services in the amount of cashback (1.2 billion rubles) according to the structure of final consumption of households.

The research has also established how the main effect was distributed as a result of the increased demand for tourist products within federal districts.

The calculations, carried out on the basis of the developed input-output model, allowed determining that a 6.5 billion rubles stimulation of population's demand for buying tours within the country provided an increase in the main economic indicators for all types of economic activity *(Tab. 3)*. In general, the gross output of the economy increased by 12.3 billion rubles. At the same time, additional increase in a number of employees amounted to 4.2 thousand people, salary fund – 2.6 billion rubles.

In the context of economic activities, the greatest effect from the population's consumption of tourist goods and services touched upon (in addition to tourism) real estate sector, intermediate demand manufacturing sector, and transport that is explained by the current cost industry structure.

Stimulation of the final demand for 1.2 billion rubles in the cashback volume according to the current structure of final consumption provided an increase in gross output in the economy as a whole by 2.4 billion rubles, the number of employees – by 1.5 thousand people *(Tab. 4)*. The increase in the salary fund amounted to 8.6 million rubles.

Based on the results of the calculation, the author determines that the most noticeable increase in population's demand for goods and services in the economic sectors affected wholesale and retail trade, real estate, and the manufacturing sector of final demand.

Thus, the use of input-output balance methodology made it possible to assess the effect on the country's economy from tourist consumption growth, as well as additional demand for goods

[8] Rosturizm summed up the results of the tourist cashback program in 2020. Available at: https://tourism.gov.ru/news/17009/ (accessed: February 10, 2021).

Table 3. The effect of the growth of the demand for Russian tourism industry products in the amount of 6.5 billion rubles on the country's economy in 2020

Type of economic activity	Increase in growth output, mil. rub.	Increase in number of employees, people	Salary fund growth, mil. rub.
Agriculture, hunting and forestry	215	100	35
Fishing, fish farming	24	4	4
Mining operations	252	15	16
Final demand manufacturing industries	516	116	51
Investment demand manufacturing industries (without machine engineering)	42	11	5
Intermediate demand manufacturing industries	863	50	31
Engineering	356	94	74
Production and distribution of electricity, gas, and water	438	127	70
Construction	126	44	22
Wholesale and retail trade	424	461	222
Tourism	**6,792**	**786**	**635**
Hotels and restaurants (without tourism)	92	58	20
Transport (without tourism)	871	240	144
Communication (without ICT)	50	10	9
Information and communication technologies (ICT)	52	60	69
Financial activities	254	32	39
Real estate transactions, rent and provision of services (without ICT)	917	505	322
Public administration and military security; social security	53	1377	843
Education	7	53	24
Healthcare and social services	6	8	4
Provision of other public, social, and personal services (without tourism)	32	65	35
Overall economy	**12,380**	**4,215**	**2,674**
Source: according to the basis of input-output modeling.			

Table 4. The effect for Russian economy from the consumption of goods and services in the amount of cashback (1.2 bil. rubles)

Type of economic activity	Increase in growth output, mil. rub.	Increase in the number of employees, people	Salary fund growth, mil. rub.
Agriculture, hunting, and forestry	160	75	26
Fishing, fish farming	6	1	1
Mining operations	66	4	4
Final demand manufacturing industries	336	75	33
Investment demand manufacturing industries (without machine engineering)	14	4	2
Intermediate demand manufacturing industries	203	12	7
Engineering	150	40	31
Production and distribution of electricity, gas and water	148	43	24
Construction	30	10	5
Wholesale and retail trade	394	429	207
Tourism	84	10	8
Hotels and restaurants (without tourism)	38	24	8
Transport (without tourism)	166	46	27
Communication (without ICT)	51	10	9
Information and communication technologies (ICT)	18	21	24
Financial activities	90	32	39
Real estate transactions, rent, and provision of services (without ICT)	359	198	126
Public administration and military security; social security	11	285	174
Education	12	97	43
Healthcare and social services	22	30	16
Provision of other public, social and personal services (without tourism)	43	87	46
Overall economy	**2,400**	**1,531**	**862**
Source: according to the basis of input-output modeling.			

and services of the national economy sectors in the amount of funds returned to tourists for the purchase of tours around the country.

The results of calculations showed that value of the multiplier of tourist expenses corresponds to 1.9. This indicates a high multiplier effect of the industry and confirms the importance of its stimulation for Russian economy, including the reduction of import dependence, as the share of imports in the formation structure of the resources for tourism products is minimal [24].

We also estimate the effect on regional economies with an increase in the consumption of goods and services of the tourist sector by Russians and additional consumption in the amount of cashback *(Fig. 2)*. According to the results of calculations, it is revealed that, in both cases, the increase in gross output in the territorial section, based on the established proportions of goods shipment, work performance and services provided by Russian enterprises, was distributed extremely unevenly with a noticeable superiority of the Central Federal District.

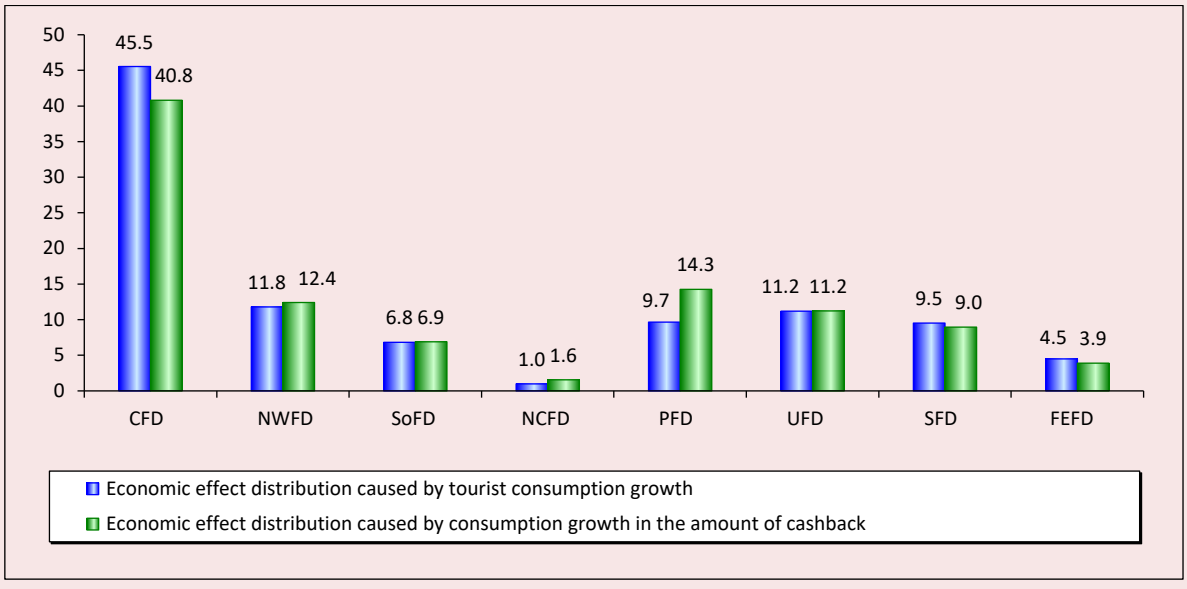
The Northwestern, Volga, Ural, and Siberian Federal Districts lag far behind the Central Federal District. The economic effect was distributed there in approximately equal proportions. The obvious outsiders include the Southern, Far Eastern, and North Caucasus Federal Districts; their share in the volume of gross output growth is very low.

The position of the Central Federal District is explained by the location of the federal city of Moscow on its territory, as well as the concentration of significant economic resources which allows occupying a leading position in comparison with other districts in many indicators of socio-economic development.

For example, in 2019, 15.5 million people used the services of accommodation facilities in Moscow, which is higher than in other federal districts of the country *(Fig. 3)*. This indicates the efficient use of available resources and concentration of production capacity in the metropolis.

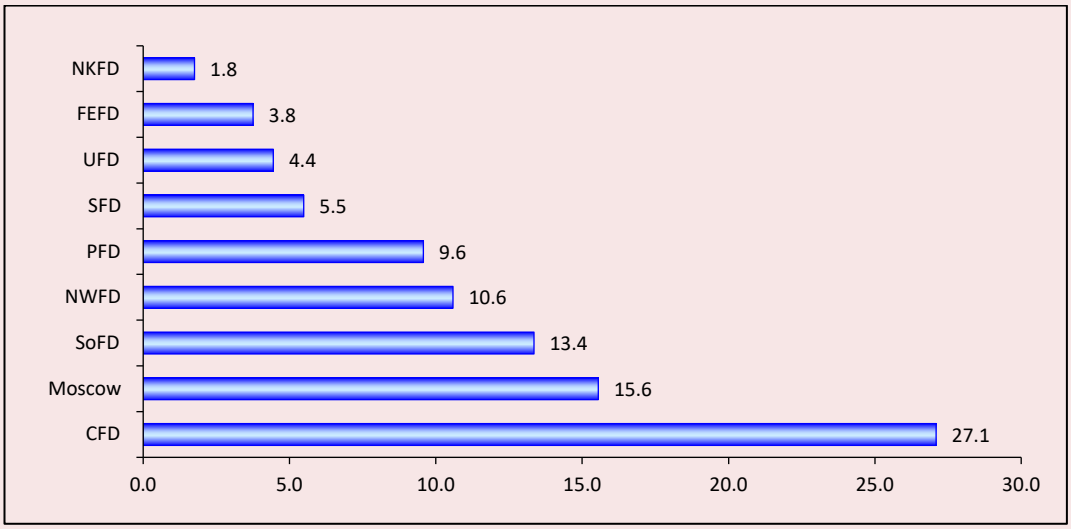
Thus, the assessment of domestic consumer demand stimulation in the territorial context in both cases showed the presence of regional imbalances

Figure 2. Increase in gross output from stimulating domestic demand by federal districts, %



Source: according to the basis of input-output modeling.

Figure 3. Number of people placed in collective accommodation facilities, by federal districts in 2019, mil. people



Source: Rosstat data.

in obtaining economic effects. Accordingly, it is necessary to use the production potential of the territories more effectively in the process of creating added value caused by domestic consumption growth. To do this, it is advisable to create conditions that are favorable for doing business attracting investment and developing industries of specialization in these regions.

Despite the existing territorial disparity from the increased population's demand for consumption of goods and services, which was expressed in the receipt of the greatest effects by the Central Federal District, most of the increase in gross output (55–60%) fell on the remaining districts. This confirms the importance of stimulating domestic demand for their economies, including the tourist products.

Opportunities for Russian tourism development in post-COVID-19 period

The calculations made it possible to determine that subsidizing domestic travel around the country has become a fairly effective mechanism for restoring consumer demand for Russian economy during the crisis period. However, the program's effect in 2020 could be much greater, as its implementation required travel businesses to reconfigure all business processes in a fairly short time. As a result, few tourists had time to buy tours in the first sales window that lasted only for a week. The program funds unspent in 2020 are used for continuing the campaign.

In general, tourism industry representatives assess this measure of state support for the industry positively. According to S. Romashkin, CEO of the tour operator "Delphin", the amount of revenue received from the sale of cashback tours in 2020 exceeded "all state support since the beginning of the year[9]". According to the Association of Tour Operators of Russia, the increase in sales of tours in Russia in annual terms is recorded by all key tour operators, and some of them have an increase exceeding 100%[10] over the specified period.

[9] Tour operators told how they were saved by the cashback program and how it should be improved for the next time. Available at: https://www.tourprom.ru/news/47774/ (accessed: February 16, 2021).

[10] Tour operators summed up the results of the "second wave" of cashback. Available at: https://www.atorus.ru/news/press-centre/new/53599.html (accessed: February 16, 2021).

According to experts' assessments, the undisputed campaign leaders with cashback in 2020 were Sochi and the resorts of the Krasnodar Krai – the weighted average share of these regions in sales was at least 45–50%[11].

We should note, that in 2021, the Federal Tourism Agency took into account the main comments to the program of key players in the tourism market, expressed the results of the first wave of its implementation which allows predicting even greater efficiency.

In 2021, cashback program is aimed at maintaining demand in the low season[12]. According to the Federal Tourism Agency estimates, only for the first four days of the third stage of the cashback program[13], which started on March 18, 2021, the volume of tourist demand for tours in Russia amounted to more than 1 billion rubles[14]. This allows drawing a conclusion about a high demand for this measure from travelers. The third cashback program is attended by about 3.5 thousand sellers of tourist services which are 40% more than in the second cashback campaign in the fall of 2020[15].

Speaking about the development prospects of Russian tourism industry in the post-COVID-19 period, we should conclude that, in the conditions of current restrictions on the departure of tourists to many foreign countries and taking into account the significant support of the industry by the state, there is a chance to significantly increase the volume of domestic tourist flow and turn the industry into a driver of economic development. Based on the aforementioned data which confirms the attractiveness of cashback program for tourists and tourist business, it can be assumed that this measure of state support will effectively stimulate tourist demand in the near future allowing partial compensations for industry losses.

Predicting the development of Russian tourism sector in the event of an improvement of the epidemiological situation and restoration of air traffic between the countries, it is worth noting that some tourists, who preferred foreign holidays before the pandemic due to a higher level of development of the tourist infrastructure and the service provided at a comparable cost, will choose trips abroad which will accelerate the recovery of the flow of outbound tourism.

The factors that will limit the development of Russian tourism industry in the short term include a decrease in population's solvency due to falling income levels[16] and instability of the economic situation in the country.

We should note that, in addition to the existing measures to stimulate the industry, its effective functioning in the post COVID-19 period can be ensured by the implementation of the following:

1. Expansion of measures to subsidize tourist trips within the country for specific categories of citizens (children, pensioners, low-income families, etc.).

One of the problems of Russian tourism is a high cost of domestic tourist services which, together with the declining population's incomes, makes recreation within the country inaccessible to many citizens. In this regard, it is advisable to implement package solutions – when the cost of a tour with an included set of travel services is cheaper than its purchase by a tourist separately, or a part of cost of tickets for various types of transport, which

[11] *Ibidem*.

[12] The Federal Tourism Agency spoke about the terms of the start of the third stage of the campaign with cashback. Available at: https://www.atorus.ru/news/press-centre/new/54286.html (accessed: February 16, 2021).

[13] The refund for the tour purchase is 20% of the price, but up to 20 thou. rubles for one operation on the card. Cashback is awarded for trips that last at least 3 days (2 nights).

[14] The Federal Tourism Agency reported on tours purchased by Russians with cashback for 1 bil. rubles. Available at: https://www.rbc.ru/rbcfreenews/6058934a9a79476f685a924e (accessed: March 22, 2021).

[15] Dates and terms of the third campaign with cashback for tours in Russia have been officially announced. Available at: https://www.atorus.ru/news/press-centre/new/54602.html (accessed: March 16, 2021).

[16] According to Rosstat, in 2020, a real disposable income of Russians decreased by 3.5% in annual terms which is 10.6% lower than in 2013.

is the main expenditure of Russian tourists, is compensated.

2. Expansion of the set of support measures for tourism business.

In the context of the increased authorities' attention to domestic tourism development, it is advisable to significantly expand the scope of support measures provided to organizations engaged in tour operator activities. In particular, it is possible to reduce the amount of value-added tax paid by tour operators. Currently, the tourist business entities engaged in the production of domestic tourism products and providing individual services to tour operators are not limited liability companies, so they either have benefits for the payment of value added tax (VAT), or use a simplified tax system. According to the largest participants of the tourist market, when combining these services into a tour package, in accordance with Russian legislation, the tour operator must pay 20% VAT on the tourist product[17], while the outbound tourist product is not subject to this tax which leads to an increase in the cost of domestic recreation.

It is also necessary to systematically implement programs to subsidize charter flights within the country. Launched in 2020 with the support of the Federal Tourism Agency, charter flights to Russia's remote areas[18] have proved their demand by tourists[19]. Thanks to this measure, the cost of a week-long tour to the Lake Baikal has decreased by half compared to 201920. This will expand the geography of travel and reduce the cost of services for domestic tourism.

3. Active introduction of digital technologies in the tourism area.

One of the current trends that determine tourism development in the world is an active development of digital technologies. Their implementation in the field of tourism in Russia is relevant for planning and buying travel. For these reasons, it is very promising to create travel marketplaces – online platforms for selling tours that unite various market participants providing a wide range of travel services. They can be integrated with existing large digital platforms of other non-core companies with a broad customer base (Sberbank, Yandex, etc.).

An example of such an online platform for tourists is the RUSPASS project created in 2020 in Moscow. Initially focused on foreign tourists, the service aroused interest among representatives of domestic tourism. So, during the year of its existence, about 80 Russian regions joined it.

4. Approach transformation to management and development of tourism industry in the regions.

The changed approach to the tourism development on the part of the state with an emphasis on the economic component should be supported at the regional level for which it is necessary to review regulation management of the industry in the entities of the Russian Federation. Currently, it is quite specific and differs in each region which is partly due to socio-economic characteristics. It is worth noting that in the regions there are no structures that are specifically responsible for the tourism industry development, as a result of which a single approach to its promotion is not observed. For example, out of the five entities that make up the Russian North, only the Tourism Department of the Republic of Karelia is responsible for tourism development as an independent management object.

Conclusion

The results of the input-output modeling analysis allowed justifying the importance of

[17] TUI heads named two main measures to support tourism in Russia. Available at: https://www.atorus.ru/news/press-centre/new/54204.html (accessed: February 16, 2021).

[18] In 2020, for the first time, there were organized charters to Khakassia, Altai, Lake Baikal, Murmansk, and Kaliningrad.

[19] ATOR summed up the tourism results of 2020 and informed about three scenarios in 2021. Available at: https://www.atorus.ru/news/press-centre/new/53770.html (accessed: February 16, 2021).

[20] Russia plans to launch more than 17 charter destinations within the country in 2021. Available at: https://tass.ru/ekonomika/10659727 (accessed: February 16, 2021).

stimulating tourist consumption for the economy. The calculated effect of the cashback program implementation showed that the gross output volume in the economy as a whole doubled causing also an increase in the wage fund and the number of employees. We state that subsidies for domestic travel programs will make it possible to increase Russians' tourist activity in the future.

Using the tools of the input-output analysis, the authors reveled the existing imbalances in stimulating the consumption of goods and services. They were expressed in the dominance of the Central Federal District which accounted for the main share of the resulting economic effect. This dictates the need to smooth out the spatial asymmetry in development of the country's regions.

Activation of the proposed directions of tourism development contributes to the industry profitability growth and the economy as a whole taking into account its multiplier effect.

Thus, the research allowed concluding that development of Russian tourism industry in the post-COVID-19 period, taking into account the large scale of state support provided to it and the presence of a significant volume of the formed deferred demand of Russians[21] for tourist services, can become one of the drivers of economic development and an effective tool for restoring domestic consumer demand.

At the same time, we should note that the improvement of official statistical information describing the industry will help to clarify the tourism impact extent on economic parameters. In particular, currently, there is no data reflecting tourist spending structure which limits the study. In addition, Russia has not yet adopted an official methodology for accounting for domestic tourist flows, and surveys aimed at studying socio-demographic characteristics of tourists are very rarely conducted. It is worth noting that the assessment of the tourism direct and indirect contribution to the economy at the regional level requires calculation. Thus, the elimination of statistical gaps in determining the multiplicative impact of the tourism industry is an urgent task, and quality of management measures taken and the choice of tourism development directions based on the forecasts of its impact on national and regional economies largely depend on its solution.

The scientific significance of the research is to expand the methodological aspects of assessing the impact of the demand growth for tourism goods and services on the economy, as well as to justify the ways of its development taking into account current socio-economic processes. The practical significance is in the possibility of using the results obtained by the authorities in order to better understand the current situation of tourism industry and develop its strategic priorities. The next stage of the research will include a study of the specifics of the regional industry functioning, definition of measures that contribute to growing population's consumption of tourist products and increase of its competitiveness.

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[21] More than one and a half trillion rubles remained in the hands of Russians due to inability to travel abroad against the backdrop of border closure during the pandemic (source: Economy support: border closure). *Ekspert,* 2020, no. 1. Available at: https://expert.ru/expert/2021/01/podderzhka-ekonomiki-zakritie-granits/).

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Methodological Approach and Tools for Ensuring Region's Balanced Spatial Development*

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Abstract. Due to the concentration of labor, financial, and other resources in agglomerations and "denudation" of regions' periphery, a number of significant problems are becoming more acute in the transformation process of spatial economic structure. Such problems threaten the balance of intra- and interregional development. One of them is an important differentiation of Russian regions' municipalities in terms of socio-economic development level. There is a dilemma of choosing the regional spatial policy vector: either to support the growth points' development (agglomerations, special economic zones, territories of advanced socio-economic development), or to reduce socio-economic inequality through additional support for the periphery development. Using the integration of the concepts of the reference frame and sub-regional approach, the research proposes a methodological approach to the balanced spatial development of the region. On the region's territory, the research distinguishes natural sub-regions, which are the elements of the territory's reference economic frame, and artificial sub-regions, which are based on inter-municipal cooperation. The essence of the approach is to establish balance between regulation of natural economic processes in the region (for example, institutionalization and reduction of agglomerations' negative effects) and state support for depressed territories' development (for example, program sub-regions' formation). Its usage in the regional management practice allows forming methodological basis for working out strategic documents for the region's spatial development, economic, organizational, institutional, and social instruments of regional policy. The work presents a set of tools for improving the spatial development balance of the Republic of Bashkortostan, related to the development of natural sub-regions which are already objective growth points in the region, as well as aimed at stimulating the economic self-development of depressed and peripheral territories of the Republic of Bashkortostan.

Key words: spatial development, reference frame, settlement frame, sub-regional approach, program sub-region, agglomeration, municipality, central place theory, theory of development poles.

Introduction

In recent years, almost all Russian regions have experienced qualitative shifts in spatial development. This also affected the Republic of Bashkortostan which is characterized by its territorial location between the largest cities with millions of inhabitants of the Volga and Ural Federal Districts. Due to the economic space contraction around the regional capital and resources outflow from the republic periphery to neighboring cities with millions of inhabitants, municipalities are segregated according to socio-economic development. In addition, the spatial development peculiarities of the Republic of Bashkortostan include fragmentation of the municipal division (the second place is in Russia in the number of municipalities including the second place in the number of rural settlements), a small number of urban districts as economic development centers, presence of a significant area of depressed territories mainly on the region's periphery, as well as stagnant single-industry towns. In addition, the inefficiency of the current regional spatial policy and investment decisions in the Republic of Bashkortostan increase disproportions of inter-municipal development.

The purpose of the work is to find a methodological approach to ensuring balanced spatial development of the region which would allow taking into account its features and creating a basis for the formation of sustainable management policy. The methodological approach implementation will be considered in the case of the Republic of Bashkortostan.

Research methodology

The article includes four components: theoretical approaches to the region's spatial development, an analysis of transformation nature of a number of spatial frameworks of the Republic of Bashkortostan, a methodological approach to the region's balanced development, directions for the practical implementation of the methodological approach.

First, we will specify the main categories that will be used in the work.

Agglomerations of the Republic of Bashkortostan. The types, composition and structure of agglomerations of the Republic of Bashkortostan are not officially approved in the regulations, so we will adhere to the agglomerations' composition according to the Territorial Planning Scheme of the Republic of Bashkortostan, but in relation to the grid of municipal divisions: Ufa monocentric urban agglomeration (the core is Ufa, Blagoveshchensk, Iglinsky, Karmaskalinsky, Kushnarenkovsky, Ufa and Chishminsky municipal districts); South Bashkortostan polycentric urban industrial agglomeration (Sterlitamak and Salavat urban districts, Ishimbaysky and Sterlitamak municipal districts); Neftekamsk monocentric small urban agglomeration (Neftekamsk and Agidel urban districts, Krasnokamsk and Yanaulsky municipal districts); Oktyabrsky – Tuymazy Oilfield Service polycentric small urban agglomeration (Oktyabrsky Urban district and Tuymazinsky municipal district).

Peripheral territories of the Republic of Bashkortostan. The peculiarity of the Republic of Bashkortostan is the capital location in the region's geographical center. In this regard, as peripheral regions, we have considered municipalities whose administrative centers are located at a distance of more than 200 km from the capital: Askin, Bakalinsky, Belokataysky, Beloretsky, Bizhbulyaksky, Burzyansky, Duvan, Ermekeyevsky, Kaltasinsky, Karaidelsky, Kiginsky, Krasnokamsky, Kuyurgazinsky, Meleuzovsky, Mechetlinsky, Tatyshlinsky, Fedorovsky, and Yanaulsky districts.

Program sub-regions are sub-regional economic areas within the framework of inter-municipal strategic cooperation, where programs are implemented to address common development challenges in integrated manner. Currently, two such sub-regions have been officially approved in the Republic of Bashkortostan: 1) Northeast of the Republic of Bashkortostan[1] (Askin, Belokatay, Duvan, Karaidel, Kiginsky, Mechetlinsky, Nurimanovsky, Salavatsky districts); 2) Trans-Urals of the Republic of Bashkortostan[2] (Abzelilovsky, Baymaksky, Burzyansky, Zianchurinsky, Zilairsky, Uchalinsky, Khaibullinsky districts). These territories are traditionally depressing.

Theoretical and methodological research

From the point of view of the region's economic space research, there are the following major theoretical developments: central place theory, theory of development poles and growth centers, reference frame concept, and sub-regional approach.

The central place theory focuses on the settlements' role as service centers for population; in the conditions of an ideal plain, each center has its own hexagonal service area [1–3]. Of course, real settlement systems do not correspond to such a model, but the central place theory was the basis for constructing a hierarchical classification of settlements and their location theories.

The theory of the growth poles (the founder is Perroux F. [4]) defines the "growth pole" as industries, individual enterprises, and subsequently individual territories that create "development impulses" that affect the territorial economic structure and its dynamics. This theory is widely accepted among Russian researchers and

[1] On the medium-term complex program of socio-economic development of the Northeastern regions of the Republic of Bashkortostan for 2011–2015: Government Decree of the Republic of Bashkortostan no. 395, dated November 9, 2011 (as amended on July 16, 2015, no. 269).

[2] On the medium-term complex program of economic development of the Trans-Urals for 2011–2015: Government Decree of the Republic of Bashkortostan no. 38, dated February 24, 2011 (as amended on July 16, 2015, no. 269).

practitioners of regional planning [5–6]. Practice shows that such growth poles, especially in the modern conditions of territories' agglomeration, develop not so much at the expense of their own sources, as at the expense of "wealth redistribution" in favor of the most powerful economic foci [7], and building regional policy by stimulating growth poles' development is not only inefficient, but can also lead to significant territory's segregation.

The reference frame theory [8–9] presents another approach to spatial development. This approach is understood as a combination of the main focuses (on the national scale, we are talking about large cities and urban agglomerations, on the regional scale – about cities and large urban-type settlements [10]) of the economic, political and cultural life of the region and the main lines connecting them. In the practice of territorial planning, three types of framework are mainly used: urban, natural and ecological, historical and cultural [11]. However, if we consider the regional strategic planning documents, there are much more frames mentioned (in the course of analyzing the schemes of territorial planning of the Russian regions, S.I. Yakovleva identifies 15 types of frames). At the same time, each species is considered as an independent and self-sufficient structure, whereas in reality they are closely interrelated and form a single system [12].

Some authors have tried to synthesize all three theories. For example, I.P. Smirnov has formulated a new concept: "a reference center for territory's development" which means a locality that performs service functions in relation to the gravitating territory, has a stable economic base with propulsive activities, and is included in the territory's reference frame [7].

In the main part of modern studies, intra-regional spatial planning is considered either from the point of view of sustainability [13] or even "local self-sustainability" [14], or the territories' specialization [15], or agglomeration, urbanization processes and their role in the region's spatial development [16–19].

I.A. Tazhitdinov proposes an economic and administrative sub-regional approach to spatial development [20], when within the region as an entity of the Russian Federation new forms of structural organization of the region's economic space are identified. It is the sub-regions which represent a zone of consolidation of powers, potential and resources for solving socio-economic problems of territorial development. Usually, municipalities with similar socio-economic development problems, stable economic ties, and presence of growth points or prerequisites for their creation are united in sub-regions. The sub-region has no signs of an administrative unit, no governing authorities, it is created for a limited period, and it is managed through a development program based on inter-municipal cooperation. There are similar sub-regions in the Republic of Bashkortostan (Trans-Urals and Northeast).

Basic provisions of all theoretical approaches are somehow manifested in the region's spatial development: the largest cities act as attraction centers for population, financial and other resources, forming agglomerations (centripetal flows directed from the surrounding territory to the city in the central place theory), while simultaneously transmitting economic effects to the agglomeration periphery (centrifugal impulses in the theory of growth poles). Inter-municipal and interregional integration is increasing (internal and external links of the nodes of the reference frame), and certain types of sub-regions are emerging in a number of regions (administrative districts in the Sverdlovsk Oblast, program sub-regions in the Republic of Bashkortostan). However, if the need to ensure inter-municipal balance is taken as the target of regional policy, it is impossible to apply these theories in their pure form in modern conditions.

Methodological approach to spatial development

We propose a **methodological approach to the balanced spatial development of the region**, based on the sub-regional approach convergence and the regional reference frame theory *(Fig. 1)*.

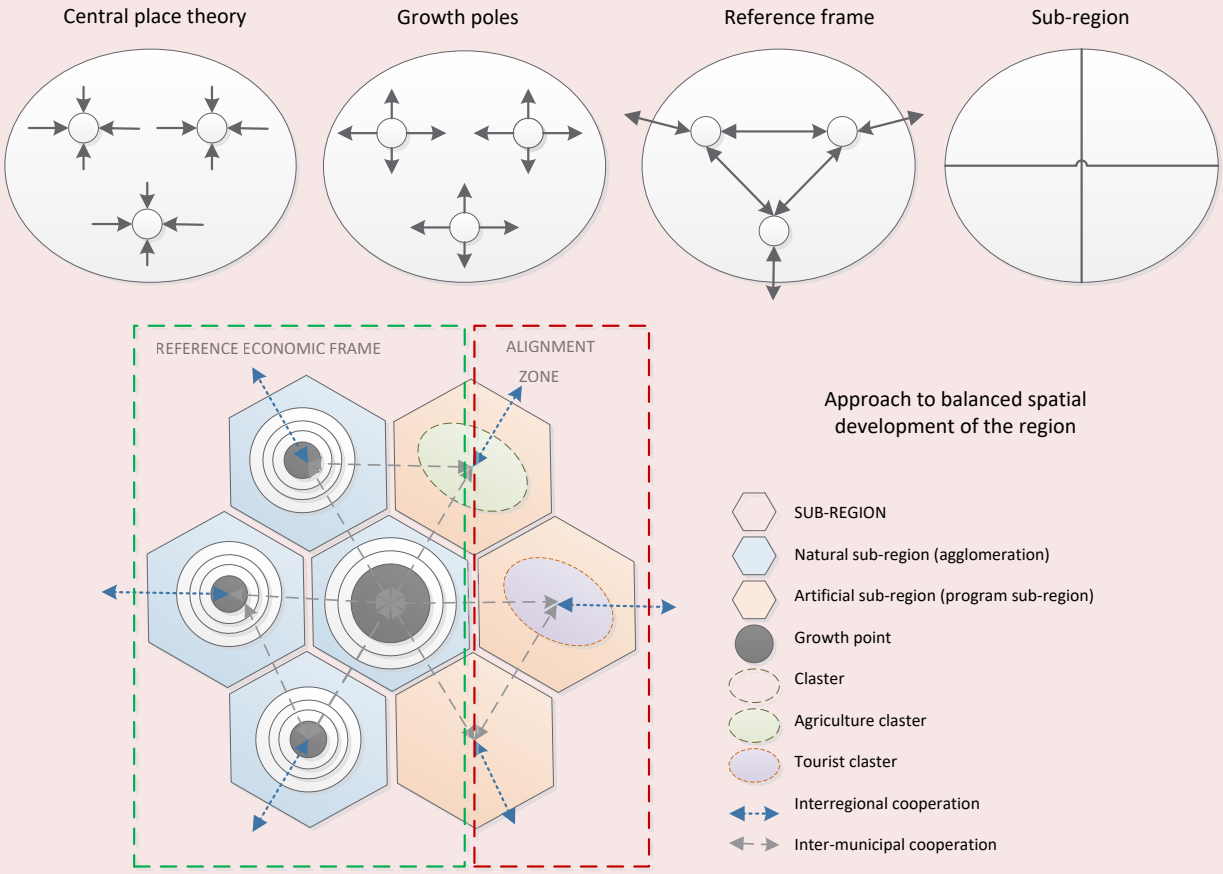
The essence of the approach is that the region's territory is divided into sub-regions, some of which are reference economic frame, and some are leveling zone to ensure balanced spatial development. Moreover, a sub-region is not just a form of geographical or economic division of the regional territory into sub-regions, some municipalities may belong to two or more sub-regions, and some may not belong to any one at all.

The main provisions of the methodological approach include the following:

1. A sub-region is a form of municipalities' integration within a region (agglomeration, cluster, special economic zone, territory of advanced socio-economic development, programmed sub-region, administrative district) which can be administrative and non-administrative. A sub-region can be formed "from below" for objective reasons – a natural sub-region (for example, an agglomeration), or "from above" to solve specific management tasks (a management district, a program sub-region). The key goal of forming a sub-region is to integrate the municipalities' efforts for the integrated development or problems' solution of a particular territory within the region.

2. Agglomerations act as the main region's reference economic frame. This is an objective fact

Figure 1. Methodological approach to the balanced spatial development of the region based on sub-regional approach integration and reference frame theory



Source: own calculations.

that regional state authorities cannot ignore. Moreover, they should lead this process by creating conditions for agglomerations' institutionalization and organization of effective mechanisms for inter-municipal cooperation there. It will reduce the negative agglomeration effects on the surrounding areas and ensure their development balance. For this purpose, the paper proposes to perceive the agglomeration as a reference sub-region of regional development and to ensure its institutional design (for example, in the form of contractual form). Institutionalized agglomerations with clearly defined functional roles and the presence of effective forms of inter-municipal interaction are becoming the region's growth pole.

3. The region's territories, that are not included in agglomerations, should be an alignment zone (as well as increased regional attention and additional investment), and artificial sub-regions can be created there if necessary. The key issue is the sub-region's specialization which will allow a group of municipalities to develop purposefully and comprehensively. In this regard, a cluster development model (agricultural cluster, tourist cluster, etc.) is suitable for such sub-regions which will help determining the functional roles of the sub-region's municipalities, attract additional investment funds, and organize inter-municipal cooperation. In the absence of explicit specialization, the sub-regional form can be a programmed sub-region that is artificially formed within the framework of regional policy for municipalities' complex development (for example, depressed territories, peripheral areas, etc.).

4. The basis for the development of both natural and artificial sub-regions is inter-municipal cooperation. Any sub-region is a form of municipalities' association, and the long-term effectiveness of such an association is ensured not only by attention and investment of regional authorities, but also by the way inter-municipal cooperation is organized there.

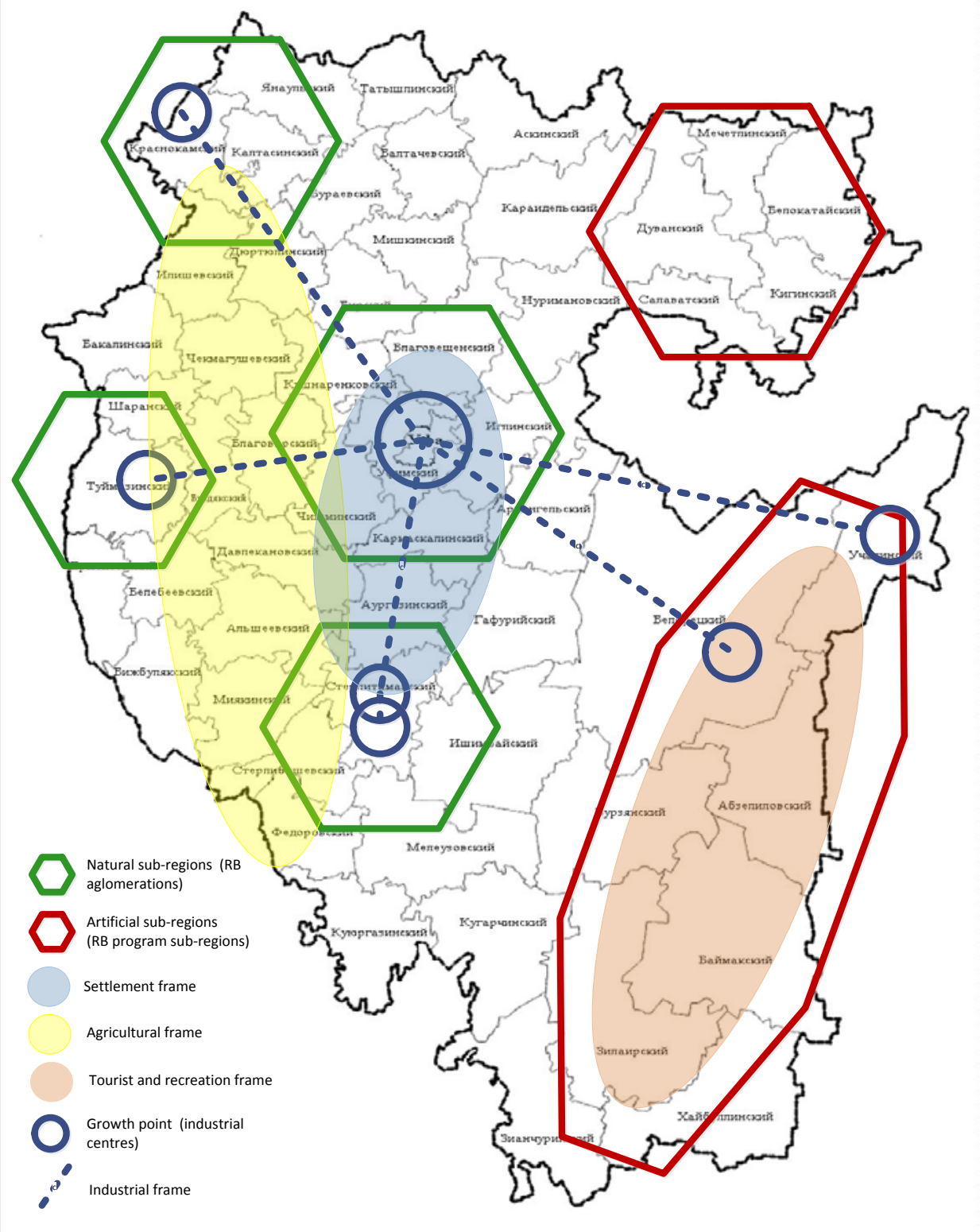
Figure 2 shows the approach implementation in the case of the Republic of Bashkortostan. The Republic of Bashkortostan peculiarity is the objective formation of four agglomerations (Ufa agglomeration; South Bashkortostan agglomeration; Neftekamsk agglomeration; Oktyabrsky-Tuymazinskaya agglomeration) at a relatively long distance from each other forming in fact the "reference square" of the regional economic development in the center and in the west of the republic. Agglomerations concentrate the main part of industrial production, investment, and jobs, and their formation is an objective process.

The right side of the map presents traditionally depressing territories (see Fig. 2). In 2011, development programs were worked out and adopted for the two sub-regions of the Republic of Bashkortostan: the Trans-Urals and the northeastern regions which include the allocated territories. The goals of the programs were the creation of favorable conditions for the economy and social sphere with careful attitude to natural resources (Northeast) and sustainable socio-ecological and economic development of territories to improve the population's living standards (Trans-Urals). These programs were the first attempt to focus political attention on the problems of unbalancing the development of the territories of the Republic of Bashkortostan, and to create growth points.

We will look at how a number of the Republic's spatial frames have transformed over the previous 10 years.

Large and medium enterprises, which affect economic development, form the region's *industrial frame*. It can be estimated by the number of enterprises and by the results of their activities. The industrial frame of the Republic of Bashkortostan is increasingly "shrinking" around the capital every year. If in 2010, 56% of the total production volume was concentrated in the capital, then, in 2019, it was already 61%. The share of the Ufa agglomeration

Figure 2. Spatial development of the Republic of Bashkortostan



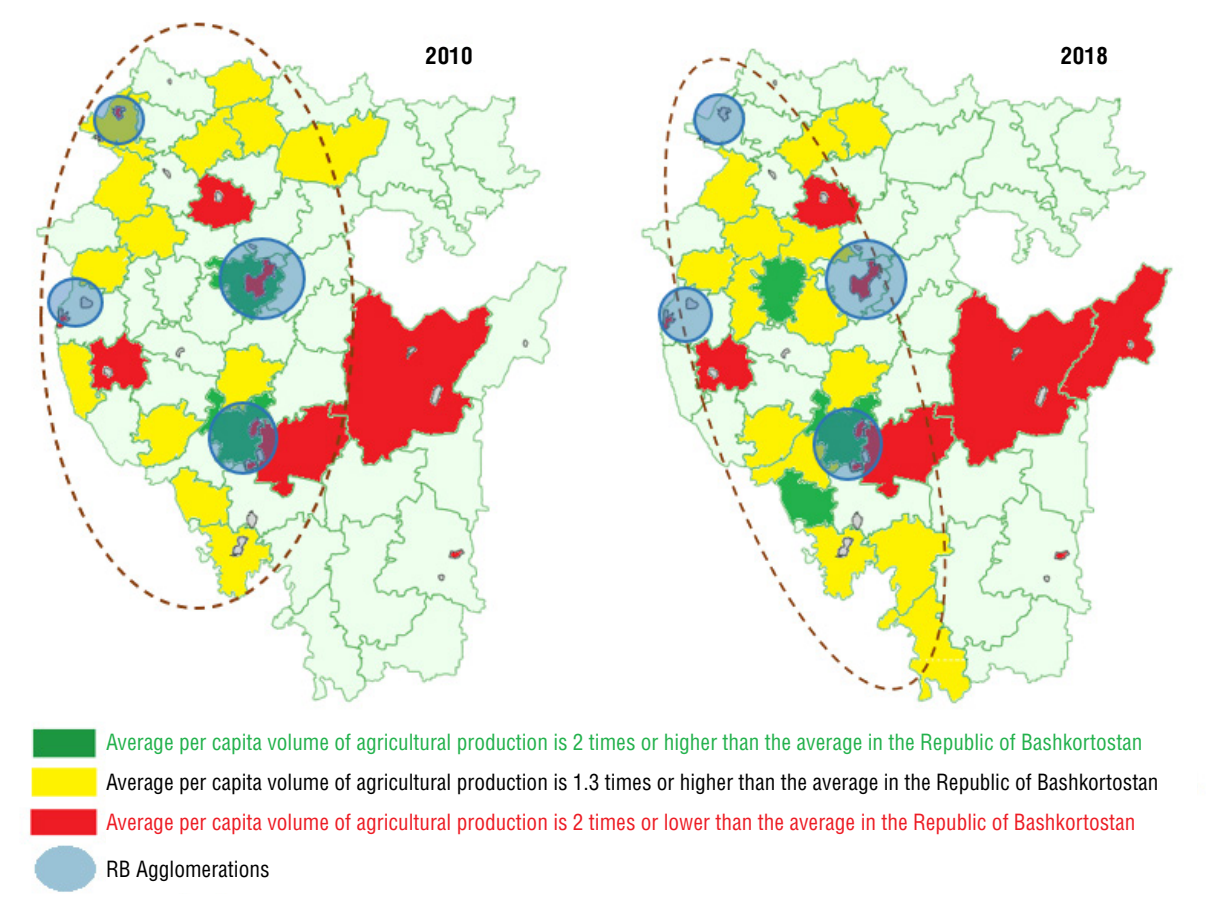
Source: own calculations.

increased from 61.6% to 65.3%. In fact, all four agglomerations (including 17 municipalities) account for 90.2% of the total economic activity of the Republic. The share of the remaining 45 municipalities has decreased from 11.6% to 9.8% over the previous 10 years.

In addition, the situation with the territorial placement of investments increases inter-municipal imbalances. For example, an analysis of the largest investment projects, implemented in the Republic of Bashkortostan, shows that all of them fall either on the largest urban districts (5 out of 12 projects), or on the territories located near major cities. Such solutions for the territorial placement of the largest investment projects are clear and obvious: the investor chooses territories with established infrastructure and more favorable conditions for business. But, nevertheless, it also affects the prospect of further territories' segregation according to the socio-economic development level.

The regional *agricultural frame* is characterized by the location within its boundaries of the distribution areas of various crops or agricultural production types [21]. The studies use different indicators of the region's agricultural specialization in statics and dynamics. In our case, we consider the territorial production of agricultural products, adjusted per capita for the Republic's municipalities *(Fig. 3)*.

Figure 3. Agricultural production volume per capita by municipal and urban districts of the Republic of Bashkortostan



Source: according to information of the Rosstat Municipalities' Database. Available at: https://rosstat.gov.ru/storage/mediabank/munst.htm

The red zone of low values of agricultural production has not changed over the previous nine years. These are all urban districts of the Republic of Bashkortostan and industrially developed municipal areas, on the territories of which there are urban settlements. Leaders' spatial transformation of agricultural production in the republic is interesting. Figure 3 shows that the agricultural frame over the years has "stretched" along the largest agglomerations providing them with the production of agricultural goods.

The *settlement frame* is formed as a hierarchical system of locations, where the cores are agglomerations in which the largest and big cities play a leading role [22].

In the four agglomerations of the Republic of Bashkortostan in 2019, almost two thirds of the region's population lived (62.1%, in 2006 – 57.9%), including the Ufa agglomeration – 36.5% (32.7% in 2006) *(Table)*.

At the same time, the number and share of residents of depressive territories decreased which indicates the flow of the Republic of Bashkortostan population from depressive and border territories to the largest cities and agglomerations.

The regional migration flows can illustrate it. In 2010–2019, the total positive migration growth was typical only for 5 of the 54 districts of the republic; all of them are located near the largest cities (Ufa, Sterlitamak). In other districts, there was population's outflow, and the further the municipal district is from the capital, the greater the outflow is.

Spatial development directions of the Republic of Bashkortostan on the basis of methodological approach

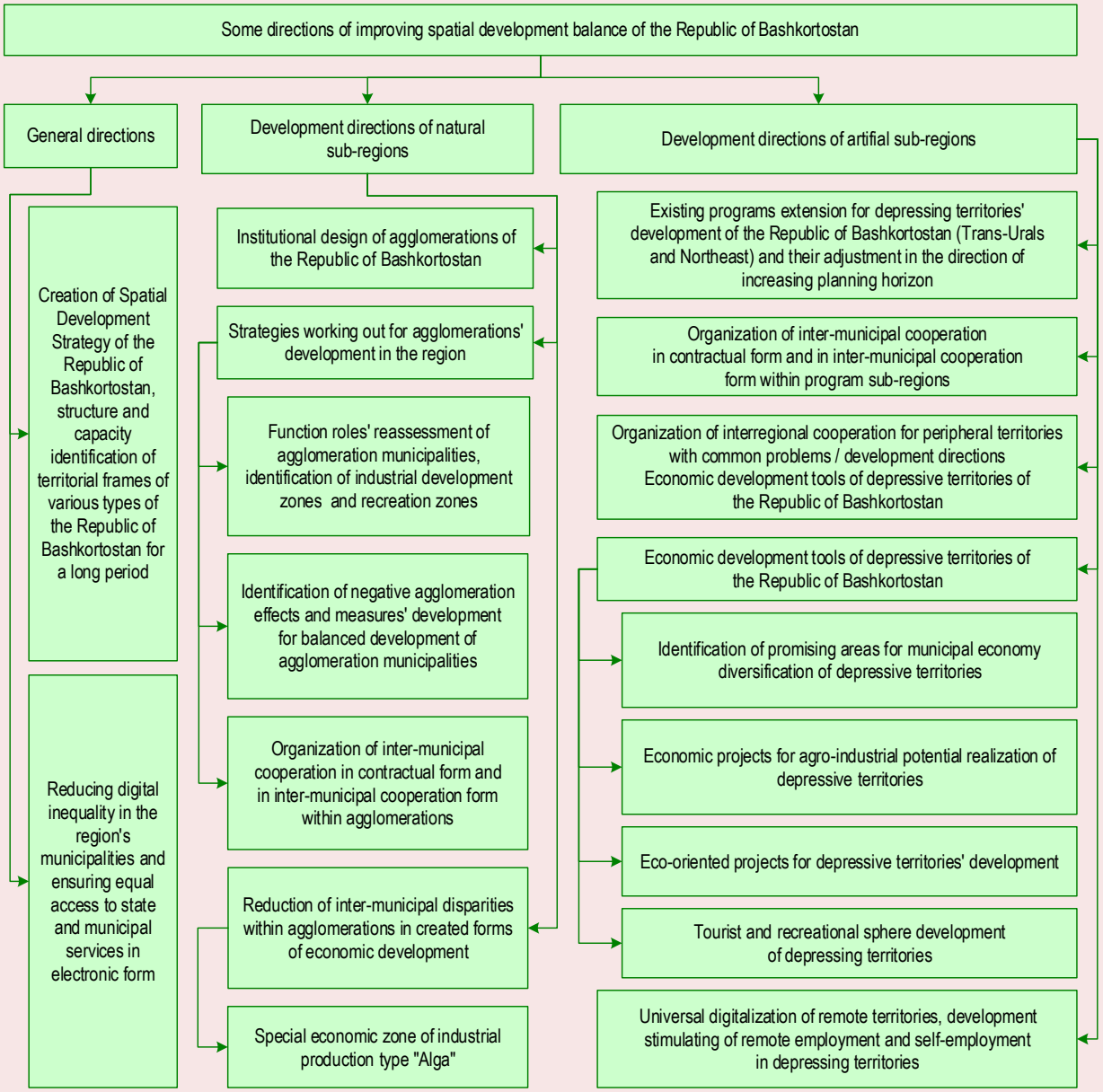
Let us consider the realization of the proposed methodological approach in relation to the Republic of Bashkortostan. The whole complex of general directions of spatial development is presented in *Figure 4*.

The whole complex of directions is divided into three parts: general directions, natural (agglomerations) and artificial (program sub-regions and depressing territories) sub-regions.

Population in municipalities' groups of the Republic of Bashkortostan, people

	2006	2010	2014	2019
Agglomerations				
Ufa agglomeration	1,323510	1,331367	1,415783	1,472800
Share in the region's total population, %	32.7	32.9	34.9	36.5
South-Bashkortostan agglomeration	552,797	554,384	563,236	559,280
Share in the region's total population, %	13.7	13.7	13.9	13.9
Neftekamsk agglomeration	224,922	227,146	225,811	225,529
Share in the region's total population, %	5.6	5.6	5.6	5,6
Oktyabrsky-Tuymazinsk agglomeration	236,990	240,764	244,302	246,531
Share in the region's total population, %	5.9	5.9	6.0	6.1
Depressing territories				
Trans-Ural (7 municipalities и 1 urban district)	339,962	344,271	329,253	320,572
Share in the region's total population, %	8.4	8.5	8.1	7.9
Northeast (8 districts)	200,123	198,640	184,050	174,500
Share in the region's total population, %	4.9	4.9	4.5	4.3
Peripheral territories – districts on the border of the Republic of Bashkortostan (18 districts)	623,643	615,958	578,134	548,267
Share in the region's total population, %	15.4	15.2	14.3	13.6
Source: according to information of the Rosstat Municipalities' Database. Available at: https://rosstat.gov.ru/storage/mediabank/munst.htm				

Figure 4. Directions for improving the spatial development balance of the Republic of Bashkortostan



Source: own calculations.

General arrangements

The Government Decree of the Russian Federation no. 207-r, dated February 13, 2019, approved the Spatial Development Strategy of the Russian Federation for the period through to 2025. It states that "the purpose of the country's spatial development is to ensure sustainable and balanced spatial development of the Russian Federation, aimed at reducing interregional differences in population's level and quality of life, accelerating economic growth and technological development, and ensuring the country's national security"[3].

[3] On approval of the spatial development strategy of the Russian Federation for the period through to 2025: Government Decree of the Russian Federation no. 207-r, dated February 13, 2019 (as amended on August 31, 2019).

It is quite logical that this purpose should be decomposed for regions whose spatial development should be aimed at reducing inter-municipal differences and ensuring their economic security.

In a number of federal entities, the spatial development directions are determined as a part of creation of socio-economic development strategies. The Socio-Economic Development Strategy of the Republic of Bashkortostan for the period through to 2030 does not describe the region's complex spatial development for the long term. There is a section "territories' balanced development"[4] which lists the directions for reducing the differentiation of municipalities' socio-economic development which are of a general non-specific nature. The Strategy also specifies the prospects for development of only two agglomerations: Ufa and South Bashkortostan, and defines the need for inter-municipal cooperation and territorial planning schemes in them.

In general, a strategy (concept, program) is necessary for the region's spatial development which would take into account the economic development heterogeneity of the municipalities of the Republic of Bashkortostan and determine the development directions of the current functional (sub-regions, zones of territorial development, etc.), frame (support frame and axis of development, settlement system, transport hubs), cluster (industrial, tourist, innovative), and administrative (municipalities) models of spatial development of the Republic of Bashkortostan.

Development directions of natural sub-regions of the Republic of Bashkortostan

1. Institutional consolidation of agglomerations' status and composition.

Today, there are no specific regulations confirming the official existence of any of the republic's agglomerations. Separate documents mention Ufa (1 town and 6 districts) and South Bashkortostan[5] (or Sterlitamak[6]) agglomeration (2 towns, 2 districts); all four agglomerations are named in the Territorial Planning Scheme of the Republic of Bashkortostan[7].

It is necessary to adopt regulatory documents that fix the agglomerations' status which, in turn, would serve as a basis for concluding inter-municipal agreements, agreements between state authorities of an entity of the Russian Federation and local self-government authorities, between agglomeration authorities and economic entities. At the same time, the formation of agglomeration management authorities is not a prerequisite, but it increases effectiveness of inter-territorial interaction.

2. Formation of agglomerations' development strategy.

Federal Law no. 172-FZ, dated June 28, 2014 (as amended on July 31, 2020), "On Strategic Planning in the Russian Federation" does not provide for such a document as the "strategy for agglomeration's socio-economic development". However, it allows working out it as a strategy for territory's part development of the entity of the Russian Federation to which agglomerations can be attributed. Nevertheless, there are practically no strategies for agglomerations' development in Russia, and only some progress in this direction can be noted in a number of regions. For example, a series of strategic sessions was held in Saratov as a part of the preparation of the Strategy for the Development of the Saratov agglomeration

[4] On the socio-economic development strategy of the Republic of Bashkortostan for the period through to 2030: Government Decree of the Republic of Bashkortostan no. 624, dated December 20, 2018.

[5] *Ibidem*.

[6] Regional project passport "Road activities program of the Republic of Bashkortostan, Ufa agglomeration and Sterlitamak agglomeration": Government Decree of the Republic of Bashkortostan no. 1282-r, dated December 12, 2018.

[7] On approval of the territorial planning scheme of the Republic of Bashkortostan through to 2020: Government Decree of the Republic of Bashkortostan no. 289, dated August 5, 2015 (as amended on August 2, 2019).

thought to 2030. At the same time, there are a number of documents that have the status of agglomerations' development concepts (Barnaul, Surgut, Samara-Tolyatti, Stavropol, etc.) which, in fact, are not strategic planning documents in the interpretation of federal legislation. Nevertheless, the very existence of such documents determines the agglomerations' development direction and their integration into the overall vision of the region's spatial development.

3. Within the framework of agglomeration strategies, it is necessary to re-evaluate the functional agglomeration's roles, and identify industrial zones and recreation.

If an agglomeration is formalized and effective inter-municipal cooperation is organized in it, there will be a comprehensive development of an entire agglomeration area taking into account the competitive advantages of each of the territories that make up the agglomeration, on the basis of common standards [23]. In this regard, one of the opportunities for economic development within an agglomeration can serve as a reassessment of its functional roles, for example, removal of industrial enterprises outside a city, organization of recreational areas within agglomeration, creation of transport and municipal infrastructure.

4. Organization of inter-municipal cooperation.

For agglomerations, it is expressed in the need to reduce the negative agglomeration effects. In particular, for the Ufa agglomeration, as a result of the suburbanization processes, neighboring Iglinsky district population grew by 133.1% (from 48.9 to 65.1 thousand people) in 2010–2019, while its tax and non-tax revenues increased by only 126% (in 2010 prices). Accordingly, population's budget security has decreased from 4.13 to 3.91 thousand rubles per person at the expense of their own tax and non-tax income of the Iglinsky district for 9 years. This suggests that, along with population growth, the social burden on the local budget has also increased significantly, although the municipality's own funds have not increased in comparable figures. Therefore, capital needs to compensate for the additional costs of municipalities by organizing inter-municipal social projects.

Artificial sub-regions' development directions

1. Extension of the existing sub-regional programs of the Republic of Bashkortostan.

As we have already mentioned, in 2011, the Republic of Bashkortostan developed and adopted two programs for the sub-regions' development: the Trans-Urals and the Northeastern regions. One of the programs' shortcomings can be attributed to their medium-term nature. Within 4–5 years, we can not expect accelerated economic growth in territories, where there have been no opportunities and internal motivation for economic development for a long time. Such programs should be of long-term nature, and measures should have been implemented for 10 years or more. Such measures will allow qualitatively changing the situation on the territory. This was partially confirmed by the extension of these programs in 2015–2016 through to 2020.

2. Organization of inter-municipal cooperation.

For artificial sub-regions, inter-municipal cooperation is the development foundation. Usually, depressed and peripheral territories do not have sufficient own funds to finance large projects; they can only solve infrastructure problems together by consolidating the resources of several budgets.

For instance, Ufa income structure in the context of "tax income : non-tax income : non-repayable receipts" is expressed in the following figures: 36% : 12% : 52%; Ufa agglomeration districts excluding the capital 30% : 4% : 66%, while in the traditionally depressed districts of the Trans-Urals of the Republic of Bashkortostan the percentage ratio is 27% : 3% : 70%, Northeast 22% : 1% : 77%. Depressive territories cannot fulfill even a third of their spending

obligations at their own expense, they function mainly due to income redistribution from senior budgets. And inter-municipal cooperation can serve as an effective mechanism for solving joint development tasks.

First of all, this applies to inter-municipal cooperation; its purpose is to combine financial resources, material and other resources to solve local issues. In general, the need for inter-municipal cooperation among municipalities arises in the areas of municipal economy and provision of municipal services that require large investment amounts, as well as in areas where issues cannot be resolved at the local budget expense.

3. Economic tools for depressed territories' development.

There are many theoretical approaches, methodological and practical recommendations for all possible options for the economic development of underdeveloped territories. Regarding the Republic of Bashkortostan, it is important to determine the municipalities' development directions that are not a part of agglomerations, for example, by evaluating their specialization, comparing the structure of the volume of shipped products, works and services by type of economic activity, or by using other numerous methods of assessing specialization. The tools for depressive territories' development include economic projects for the development of agro-industrial potential, eco-oriented development projects, the development of the tourist and recreational sphere, etc.

Taking into account the existing natural and climatic potential and resources, the most promising development areas of the depressed territories of the Republic of Bashkortostan are agriculture development in the northeastern regions and tourist and recreational sphere improvement in the Trans-Urals of the Republic of Bashkortostan.

The agricultural sector of the Republic of Bashkortostan is one of the most promising in the region. In 2019, the republic ranked seventh in the country in terms of agricultural production, second in terms of milk production, first in terms of honey production, third in terms of cattle, fourth in terms of gross potato harvest, etc. Currently, the share of agriculture in the republic GRP is 6.0%, but this figure is annually decreasing. Despite rather large investment volumes in depressed territories, the volume and cost indicators of agricultural development are decreasing there.

New directions in agriculture development in depressed areas should be focused on the new wave of import substitution, associated with the consequences of the spread of the coronavirus infection COVID-19, and industry adaptation to the modern requirements of universal digitalization.

With regard to the first, the authors should note that the situation with COVID-19 may be a chance to increase the supply of agricultural products within the country to regions with a lower level of self-sufficiency. However, in the republic, there are problems of having a full completed cycle; in particular, there are not enough enterprises for processing agricultural products in a "closed cycle", logistics centers of district and inter-district scale. In this regard, large-scale projects of regional significance, such as agro-industrial cluster creation in the northeastern regions of the Republic of Bashkortostan, where there is a great potential for agricultural development, but there are no domestic consumers, are particularly relevant. The cluster will bring together producers, processors, and trade sector, providing a cumulative effect of interaction between agribusiness and other related structures. The project will be developed only if interregional and inter-municipal cooperation is organized with neighboring regions of the Federation (Sverdlovsk and Chelyabinsk oblast) as consumers of agricultural products. Taking into account the realities on the world markets of agricultural products, the development of anchor projects for organization of large commodity markets in the presence of a significant potential of the republic is very promising.

As for the second one, there are no projects on agriculture digitalization in the region yet. Even the Strategy-2030 of the Republic of Bashkortostan only mentions the need to improve the industry efficiency through the introduction of innovative and high-tech technologies, in particular, the growth in the number of innovative developments in the industry from 5 to 50 in 2016–2030. But this requires a qualitatively different approach to management, it is necessary to solve the software problem for agronomists and the search for specialists who can apply IT technologies in agriculture. Personnel and resource support of the industry is also one of the primary tasks of the strategic industry development.

The second promising direction of depressive territories' development of the Republic of Bashkortostan is tourist and recreational sphere development. In general, the tourism industry of the republic is one of the most dynamically developing: over the 2010–2019 period, the number of collective accommodation facilities in the region 1.4 increased, the number of persons placed in them – by 1.7 times, recreation centers – by more than 2.0 times, tourist bases – by 5.0 times. In 2019, the Republic of Bashkortostan is the leader among the regions of the Volga Federal District in terms of the number of people who were treated and rested in sanatorium-resort organizations, recreation organizations and tourist bases.

For the republic, tourism and recreation development is very important tool for reducing the disparity of inter-municipal development. This is due to the fact that the most attractive, from the point of view of tourism development, are not municipalities in the vicinity of the largest cities, but municipalities of traditionally depressed sub- regions of the Republic of Bashkortostan: Trans-Urals and Northeast, as well as territories with natural parks and other natural attractions. For example, it is tourism, and not agriculture, that becomes the "lifeline" of the economic development of the second depressing zone of the republic – the Trans-Urals. The presence on this territory of the Bashkir and South Ural state nature Reserves, the Shulgan-Tash Nature Reserve, the Iremel Nature Park, state nature reserves, more than 30 natural monuments, dozens of tourist routes, the largest sanatoriums, ski resorts and other attractions make this territory very promising in terms of tourist attractiveness.

Certain actions on the part of the region on this issue have already been initiated, and documentation is currently being prepared for the creation of a special economic zone of the tourist and recreational type "Ural".

However, there are problems of providing tourist facilities with necessary infrastructure (transport, hotels, and entertainment), a lack of qualified personnel, and developed business and legal environment in the territory. The formation of these conditions is the basic requirement for attracting residents and tourists.

4. Universal digitalization of remote territories, stimulating development of remote employment and self-employment of population. Separately, it is worth noting the special importance of territories' digitalization of remote from large economic centers (the republic's periphery, depressed territories). For depressed municipalities in conditions of differentiation and uneven intraregional development, digitalization is an important factor in leveling their socio-economic situation.

The problem of lack of jobs in depressing territories is partially reduced if a municipality has the capacity (primarily digital accessibility) to provide remote work. A specialist with available knowledge and skills (which can also be obtained remotely) does not have to go to the capital or major cities (even to the administrative centers of municipal districts), when it is possible to develop professionally without leaving a rural settlement. At the same time, he will receive a salary that may be below wages in a capital, but not less than average wages in a municipality.

As a result, in depressing territories, a layer of the solvent population may appear, ready to purchase goods and services. In turn, following the demand that has arisen in depressed municipalities, supply will begin to appear, shops and service enterprises will open which will create new jobs. Naturally, this depends on digitalization of remote territories, availability of Internet technologies for population, and ability to purchase funds for working on the Internet. Economic consequences for the territories will not arise immediately, but, in general, this trend is positive and may lead to the fact that some depressing areas will no longer be such, and there will be more attractive places to live in the Republic of Bashkortostan.

Conclusion

The idea of identifying the support frame / points / growth poles of the region and the alignment of the rest of the territory is not new, and, theoretically, it is implemented in one way or another in each subject. But, practically, it is much more profitable both the region and private investors to support growth points' development: agglomerations, special economic zones, territories of advanced socio-economic development, etc., as they bring particular economic results and ensure the region's competitiveness. Policies reducing socio-economic inequality are not as effective, or their results are long-term, slightly exceeding the horizons of political planning. However, nevertheless, territories' development equalization is necessary, as economic segregation directly affects the equality of population's social opportunities.

In this regard, allocation of natural and artificial sub-regions and implementation of specific regional policy measures will help balancing region's spatial development. Of course, it is necessary to take into account the peculiarities and problems of a particular entity of the Federation which determines the use of various tools and state influence methods.

The article presents regional policy tools that can be used to ensure territories' balanced development within natural sub-regions that are objective growth poles (agglomerations, special economic zones, territories of advanced socio-economic development). On the other hand, they stimulate the economic self-development of depressed and peripheral territories and, as a result, the solution of population's social problems.

In general, the scientific significance of the study consists in the development of theoretical and methodological provisions on improving the spatial policy of the region in terms of ensuring a balance of intraregional development. Of practical importance is the justification of promising directions of the regional policy of spatial development of the Republic of Bashkortostan, which can be used by state and municipal authorities as an information and methodological base in the development of strategic and program documents for the development of the Republic of Bashkortostan and its municipalities. It could also be applied in other regions taking into account their own spatial development peculiarities.

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Spatial Management of the Shipping Routes in the Russian Arctic*

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Abstract. The new plans for Russian Arctic development are predetermined by changes in the external economic environment and the state's internal policy. In May 2018, Russian President Vladimir Putin announced new development guidelines for the Northern Sea Route. Later on, the documents related to the strategic development of the Russian Arctic zone were approved. In these documents, the Northern Sea Route development is highlighted as one of the main directions of competitive national transport communication of the Russian Federation on the global market. The purpose of the research is to determine the role of the Northern Sea Route in the country's spatial and socio-economic development in the context of the Spatial Development Strategy of the Russian Federation until 2025. The long-term plans launched various economic, political, and other socially significant processes in the Russian Arctic, which led to the formulation of two research tasks. The first one is to consider the main approaches to the

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spatial management of the regional economy and to present the implementation of the spatial economy provisions in case of the Northern Sea Route that is the center of the Arctic space "assembly". The second one is to reveal the Northern Sea Route potential as a transport and logistics highway in the transit traffic area, transportation of raw materials, and ensuring vital activity of the population of the Northern regions in deliveries of goods to the Northern territories. As a result of the research, the authors have identified the main trends in the NSR development: strengthening of Russia's domestic economic policy, aimed at activating business processes in the Arctic zone of the Russian Federation, and the usage of the NSR as an international transit highway. Data analysis on transportation of raw materials and goods deliveries to the Northern territories indicates that inland navigation will soon be a dominant type of navigation on the Northern Sea Route.

Key words: Arctic, spatial economy, Spatial Development Strategy of the Russian Federation, Northern Sea Route, cargo turnover.

Introduction

Currently, Russia is the largest Arctic state for which multidimensional development of the Arctic zone is a matter of world leadership in the Arctic economy. This target raises the question of the need to apply expanded scientific understanding of the Arctic to ensure regional sustainability. The growing interest of the state in the "new" Arctic development is confirmed by intensification of legislative activities, development of various strategic programs, emergence of permanent discussion platforms, and other Arctic events.

Changes in the spatial organization of the Russian economy over the previous two decades can be represented as two multidirectional vectors. The first one has been an active integration into the world economy since the 1990s. It was accompanied by adoption of new rules of world trade, a significant change in the distribution of production factors, increased concentration of capital, scientific, technical, and innovative potential in large urban agglomerations. The second one was to strengthen the system of state strategic planning and management aimed at addressing issues of spatial and economic development of the country including regions and individual industries. This trend has intensified since 2014 on the background of changes in international policy and introduction of a number of political, economic and other restrictions.

One of the general directions, laid down in the Russian strategic development documents adopted in 2014–2020, is the development of the Arctic Zone of the Russian Federation, in particular the Northern Sea Route (NSR) as a historically established national transport communication of the Russian Arctic and transit corridor of global importance. It is necessary to emphasize the importance of the Northern Sea Route for regions with access to the Arctic seas and long coastline, with insufficient development of the system of land communications of year-round operation, as well as the role of sea routes in close connection with inland waterways and meridional railways of the European and Asian North. The geopolitical and transnational importance of maritime navigation in the Arctic zone is determined by the need to control rich natural resources and marine areas, as well as the transit value of the Northern Sea Route as an internal route between the northwestern and Far Eastern regions of Russia. This route development opens up opportunities for the growth of transnational transit traffic between European ports and ports in the Pacific region.

Thus, the current trends actualize scientific research of the modern experience of economy management in the Arctic territory of the Russian Federation through the prism of the Arctic

communications' development in the NSR waters in the context of a new wave of the region's industrial development.

The research methodology is based on a general scientific approach. Theoretical constructions are based on the results of expert evaluation of domestic and foreign scientists and specialists in the field of spatial economics. The information base includes collected and systematized research on development of the Arctic and the Northern Sea Route, legislative and regulatory acts of the Russian Federation regulating the issues of state management of the economy and the formation of strategic planning system; information and analytical materials of foreign analytical centers (the Centre for High North Logistics (CHNL)) and the state authorities of the Russian Federation.

Theoretical basis of the research is the works of domestic and foreign scientists in the field of spatial organization of the economy, economic history of the northern territories' development, as well as works on the role of the communication system in the process of organizing regional markets in the regional space development as a systemic whole (A.G. Granberg, P.A. Minakir, A.I. Tatarkin and their followers) [1; 2; 3]. For example, the works of S.V. Kuznetsov, V.S. Selin, and T.V. Uskova present the basics of the spatial organization of the regional economy of the Arctic and northern territories, issues of management and justification of the rational organization of the Arctic communication system and the Northern Sea Route [4; 5].

Modern "process of assembling" the Russian Arctic space around the regional communication system is based on strengthening the geographical (traditional), historical, and economic connection of the Arctic space and the Northern Sea Route. For instance, the theory of new economic geography justifies the leading role of communications in the process of organizing regional markets, as well as in the regional space development as a systemic whole (P. Krugman, J. Harris, A. Pred) [6; 7; 8; 9]. P. Krugman and his followers argue that as the regional communication system is diversified, agglomeration is formed which is the structure of providing access to the market. As a result, this allowed identifying a certain pattern: in the agglomeration formation, guaranteed access to the market (through a diversified communication system) is more important than other communication properties (the effect of scale and/or diversity, mobility of production factors or availability of communication routes). In the Arctic, the diversification effect of the regional communication system is particularly noticeable in the transportation and redistribution of energy resources (oil) in the western and eastern directions when there is a shortage of these resources.

The economic history of agriculture development of Russian northern (Arctic) territories shows that industrial North development would be impossible without development of Arctic navigation and management of reliable transport links. Geological discoveries in the 30s and the beginning of development of industrial deposits of non-ferrous and precious metals, coal and oil, mineral fertilizers (Monchegorsk, Kirovsk, Vorkuta, Ukhta, Amderma, Igarka, Norilsk, Magadan, Pevek) required the organization of transport links. Two options were considered: the first one is the construction of a latitudinal railway from Murmansk and Arkhangelsk to Lena and the Pacific Ocean, the so-called highway of the three oceans – the "Great Northern Route"; the second one is the Northern Sea Route. In fact, it was about two concepts of the North development: latitudinal (the idea of concessionary development) and meridional (construction of railway and river highways leading to domestic markets) [10].

As a result, on December 17, 1932, the Council of People's Commissars of the USSR decided to organize the Main Directorate of the Northern Sea Route and set the task: "To finally lay the Northern Sea route from the White Sea to the Berengov

Strait, equip this route, keep it in good condition and ensure the safety of navigation along this route" ("Izvestia", December 21, 1932) [11, p. 3]. In this way, the Northern Sea Route was involved in the sphere of national economic and social development.

In fact, the entire pre-war period of the Northern Sea Route development was associated with major Arctic expeditions. This is the voyage of the icebreaker steamer "Litke" (1934), high-latitude expeditions on the icebreaker steamer "Sadko" (1935 and 1936) [11, p. 12]. Economic and scientific-applied issues, related to the study and development of natural resources, were brought to the fore. The experience of the first navigations was in demand during the Great Patriotic War when military vessels were driven from east to west [10].

The post-war period is characterized by revolution in the equipment of the Arctic fleet. The powerful diesel-electric icebreakers "Moscow", "Leningrad", as well as the icebreaker "Lenin" with a nuclear power plant, six icebreaker-transport vessels of the Lena type were put into operation. The construction of such icebreakers made it possible to expand the period of Arctic navigation and, accordingly, the Northern Sea Route capacity [11, pp. 30–31]. Throughout the entire period of the Northern Sea Route development, expeditionary scientific research and economic development of hard-to-reach territories continued.

In 1970–1980, researchers identify a new stage in the NSR development [11] when the main country's oil production base was created in the Western Siberia North. By 1980, oil production was more than one second, and gas production was one third of the all-Union production. Transportation along the western part of the Northern Sea Route contributed to the search for gas on the Yamal Peninsula and in the northern part of the Yamal-Nenets Okrug. Also, development of a large non-ferrous metallurgy center in Norilsk and its connections with other regions of the country mainly by water transport have led to the need for further navigation development in the Northern seas. During the economic expedition of the Siberian Branch of the USSR Academy of Sciences, headed by Academician A.G. Aganbegyan and conducted in 1980 along the coast of the Siberia along the Northern Sea Route, the issues of creating territorial production complexes (TPC) in high latitudes were investigated, and it was confirmed that the prospects of the TPC depend on their transport support.

Each stage of economic development of the hard-to-reach Northern territories set new tasks for the NSR development for science and industry: extending the navigation terms on the Arctic seas, changing the tactics of ice navigation increasing the icebreaker and transport fleet; improving the coastal infrastructure, improving the management system.

Modern scientific research is devoted to the challenges and realities of the Northern Sea Route development in the 21st century. For instance, V.S. Selin analyzes the cargo flows of the Northern Sea Route primarily from the standpoint of export supplies to the main world markets [4]. According to the research, the NSR operation on the principles of economic efficiency, taking into account the ice situation (the need for icebreaking support), is possible with the volume of cargo transportation of at least 20 million tons per year [12]. At the same time, the volume of cargo transportation on the NSR in 1990–2000 decreased by more than four times, and in the Eastern sector of the NSR – by 30 times (in Soviet times, it did not exceed 7 million tons). At the same time, most researchers associate the strategic prospects for the Northern Sea Route development with the development of new hydrocarbon deposits in the Arctic region.

The experts' discourse has recently focused on the possibility of using the NSR as an alternative to the southern route, and the prospects for

implementing the sub-global strategy "One Belt – One Road". According to Chinese scientists, in comparison with traditional sea routes, the NSR provides lower costs and can serve as an energy corridor. It also highlights its strategic value as a catalyst for economic activity and cooperation in the Northern Hemisphere [13]. The possibilities of combining the "One Belt – One Road" strategy and the Russian integration project of the Eurasian Economic Cooperation, as well as the impact of this potentially synchronized project on the Far Eastern segment of the Russian spatial development strategy, are evaluated in [2].

NSR in the context of the Spatial Development Strategy

The Northern Sea Route is officially a shipping route connecting Northern Europe with Asia. The current NSR boundaries are defined in the Commercial Maritime Code of the Russian Federation[1]: from the Kara Strait in the west to the Cape Dezhnev in the east, and are associated with the ice situation in these areas. The NSR is a unique transport highway in terms of its geopolitical and geo-economic position, its role in ensuring the country's defense capability, and its reserves of natural resources. Its water area development has had a significant impact on the economy, culture and life of the peoples of the Far North, in particular the small ones (Nenets, Evenks, Chukchi, Koryaks, Itelmen, and others). The Northern Sea Route and the North-Eastern Passage are considered synonymous in various sources. But we should note that the North-Eastern Passage includes the Barents Sea and access to the Murmansk Seaport, in such a way forming a common route in the Russian sector of the Arctic between the Cape Nordkap and the Bering Strait.

In the context of the Spatial Development Strategy of the Russian Federation for the period until 2025[2] (hereinafter – the Strategy), the Northern Sea Route unites Russian Arctic economic space. Spatial organization is a naturally formed order of spatial development of the regional economy which is determined by localization of productive forces (labor and capital) and economic relations. According to the Strategy, the combination of homogeneous localities is embodied in the form of centers that represent the territory (and adjacent subsurface) of one or more municipalities taking into account the adjacent water area (mineral resource center). They respectively specialize in high-efficiency production, within which there is a set of developed and planned for development deposits and promising areas, connected by a common existing and planned infrastructure and having a single point of shipment of extracted raw materials or enrichment products to the federal or regional transport system [14].

Within the framework of the space, the Strategy defines the geostrategic territory: the Russian Arctic and priority mineral resource centers. The territories' grouping, presented in the Strategy, is associated with changes in the spatial organization of the country's economy as a whole, in particular, with the shift of production of hydrocarbon raw materials to the poorly developed territories of Eastern Siberia and the Far East, the waters of the shelves of the Far Eastern and Arctic basins. The goals, main directions and tasks, as well as the mechanisms for implementing the state policy of the Russian Federation in the Arctic are defined by the Presidential Decree no. 164[3], dated March 5, 2020. Infrastructure support for developing

[1] Code of Merchant Shipping of the Russian Federation no. 81-FZ, dated April 30, 1999. *Official Internet website*. Available at: http://www.pravo.gov.ru (accessed: October 5, 2020).

[2] On approval of the spatial development strategy of the Russian Federation until 2025: Government Decree of the Russian Federation no. 207-r (as amended on August 31, 2019), dated February 13, 2019.

[3] On the Fundamentals of the State Policy of the Russian Federation in the Arctic for the Period through to 2035: Presidential Decree of the Russian Federation no. 164, dated March 5, 2020. Available at: http://publication.pravo.gov.ru/Document/View/0001202003050019 (accessed: October 30, 2020).

mineral resource centers is the main priority. The establishment of successful entrepreneurship in the geostrategic territories of the Russian Federation, located within the Russian Arctic zone, requires further Northern Sea Route development as a transit corridor of global importance[4].

Discussion on the NSR potential

Let us consider the main directions of revealing the Northern Sea Route potential as a transport and logistics highway in the field of transit traffic area, transportation of raw materials, and ensuring vital activity of population from northern regions in the form of deliveries of the Northern territories.

Transit traffic area reveals the opportunities for participation in international transport links and development of transport services in international business.

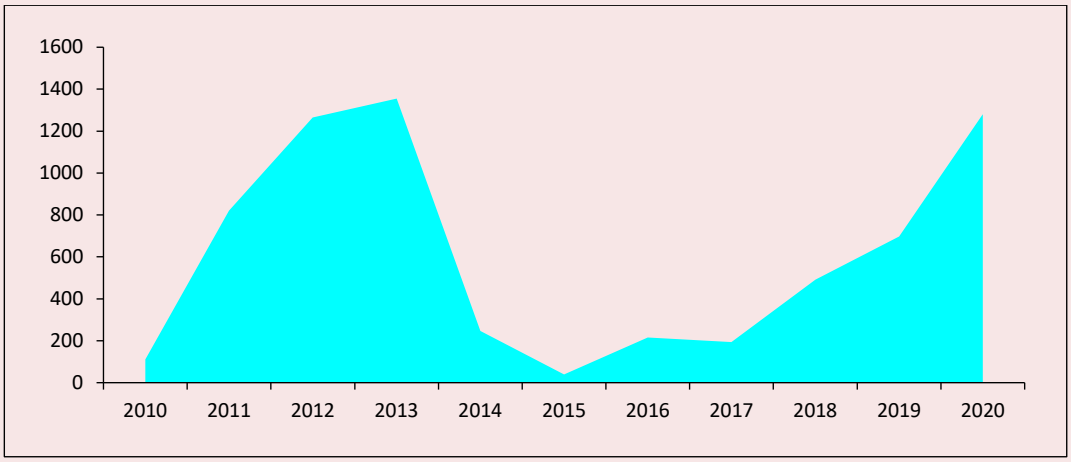
Efficiency estimates of the Arctic traffic area are quite contradictory [15; 16]. Experts identify various factors that hinder development of commercial "passage", such as *low throughput* (in 2013, 71 ships passed through the NSR, about the same number of ships pass through the Suez Canal in two days) [17, p. 260]; special *natural and climatic* conditions (shallow waters of the northern seas, low temperature conditions, as a result, short navigation times and the need for icebreaking wiring) [18, p. 18]; *financial factors* (pilotage fee for passage through the NSR, payment of icebreaking wiring, total insurance risks) that objectively cause a high level of operating costs and affect profitability of cargo delivery through the NSR [19].

Transit traffic area volume between Europe and Asia on the NSR is characterized by high volatility over the previous decade. From 2010 to 2013, there was an increase in cargo traffic, and, since 2014, a sharp decline has begun in the volume of transit traffic area. According to statistics, the number of transit flights and their cargo turnover has been growing since 2018. In 2020, compared to 2019, cargo turnover actually doubled from 697.3 to 1281.01 thou. tons *(Fig. A)*.

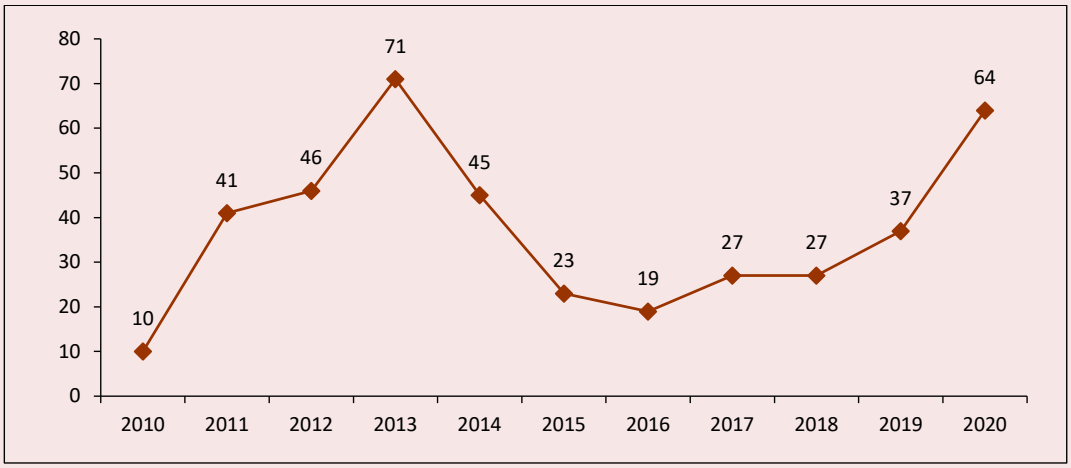
With the volume growth of international transit traffic of goods, the number of flights (ships) increased disproportionately to the volume of cargo turnover in some periods *(Fig. B)*. For example, in 2011–2012, the volume of goods, transported in transit, increased by 34%, and the number of ships – by 2.7%. A similar situation was in 2017–2018 when, with an increase in the volume of transported cargo, the number of ships remained unchanged. This is due to the more efficient use of ships (less ballast crossings – more "double" voyages). In 2020, the main share of transported cargo was iron ore concentrate (1,004,134 tons, in 2019 – 697,277 tons). In 2019, there were 13 flights with iron ore. Among them, six vessels were from Murmansk and seven from Nunavut (Canada). Three of them also went in the opposite direction from east to west (return flights). The ice class of most of these vessels is generally low. Six vessels have the Ice 2 class, three vessels – Arc 4 and two – Arc 5. Only two of the total displacement exceeded 65 thousand registered tons, the rest – from 41 to 44 thousand tons. Other transit cargo was transported by ships owned by COSCO. Eight vessels with a capacity of 22–26 thousand tons made eleven voyages from east to west and in the opposite direction. It is worth noting that the return flights were also loaded. In total, COSCO transported 198,451 tons. These are wind equipment, wood pulp, fertilizers and other general and bulk cargo. Ports of departure and destination in Europe were located in Denmark, Finland, Lithuania, Germany, and Sweden. Most of the vessels passed the NSR water area without difficulty. The nuclear container ship "Sevmorput" crossed the NSR the fastest (5.9 days), the ship "Callisto" was the slowest (13.8 days). If we exclude these maximum and minimum values, we find that

[4] Draft unified plan for achieving the national development goals of the Russian Federation for the period through to 2024 and for the planning period through to 2030. Available at: http://government.ru/news/36606/ (accessed: October 30, 2020).

Figure 1. Dynamics of transit cargo traffic 2010–2020



A) Volume of international transit cargo traffic area, thou. tons



B) Number of transit flights, items

Source: The Centre for High North Logistics (CHNL) Available at: https://chnl.galschjodtdesign.no/?p=2225 (accessed: February 12, 2021).

in 2020, transit ships crossed the NSR in an average of 8 days. At the same time, only one vessel used icebreaking support. It was "North Spitzbergen" which ran in late July – early August. Despite the positive dynamics, the volume of transit cargo in the total volume of traffic remains insignificant – about 4%[5].

Nowadays, it is impossible to give an unambiguous assessment of the prospects for developing international transit transport. From the analyzed array of foreign scientists' (26) works on this issue [15] for the period from 1991 to 2013, half of the studies has drawn conclusions on the profitability of Arctic transportation. The other half is divided into two parts: in seven works, the authors came to the opposite conclusions, in six – contradictory. A similar situation is in the domestic research field. Economic laws imply the choice of a cheaper option for the route of cargo/goods transportation,

[5] According to data of the Northern Sea Route Administration (December 10, 2020), the total traffic volume in the NSR waters amounted to 30,858,7 thou. tons including transit traffic area of 1281 thou. tons. *Information and Analytical Agency "PortNews"*. Available at: https://portnews.ru/news/306100/ (accessed: February 12, .2021).

all other things being equal, so to the above factors that hinder the development of this direction, it is necessary to add the features of the functioning of the container transport market. According to experts, in the container transportation market, up to 70% of pricing occurs in the spot market where price fluctuations reach up to 25%. According to the PWC[6], in 2018, cargo traffic between Asia and Northern Europe amounted to 15 million TEU (conditional 20-foot containers), and the total volume of international maritime trade – 23.1 million TEU. Accordingly, in order for the "new" Arctic sea transport system to occupy its niche in the world market, its turnover must be at least 2.5 million TEU. In order for the logistics market participants to perceive the new offer as competitive, it must be 10% cheaper and 20% faster. In the short term, most international economic agents do not consider the Arctic routes as economically profitable.

In the field of transportation of raw materials. Economic development of the Russian Arctic zone is based on the extraction of hydrocarbon raw materials and implementation of geological exploration aimed at identifying new production areas. The unique potential of hydrocarbon raw materials is represented by natural gas, oil, and natural bitumen. The recoverable reserves of hydrocarbons amount to about 245 billion tons of conventional fuel in the fields located in the Arctic zone. About 85% of these reserves are concentrated in the West Siberian, Timan-Pechora and Barents-Kara oil-and-gas provinces (OGP), while the main share of reserves (161.7 billion tons of conventional fuel) falls on the West Siberian OGP[7].

The development of fuel and energy resources in the Russian part of the Arctic determines the dominance of Russian inland navigation in the NSR in terms of the number of shipping companies, ships and flights. In 2016–2019, Russian shipping companies accounted for 62–73% of all shipping companies operating on the NSR, and made 75–87% of all flights. The main volume of cargo is accounted for by energy resources (LNG, oil, coal) and metals [20, pp. 7, 15].

European companies also participated in domestic shipping on the NSR. In total, up to 23 companies operated each year which made 269 flights in four years. They provided general cargo vessels, bulk carriers, heavy carriers, and auxiliary vessels for maritime operations. Most of the flights took place between Murmansk and Sabetta, as well as between the areas of the Kara Sea and the Gulf of Ob. Norwegian shipping companies serviced drilling operations in the Kara Sea, and companies from Luxembourg, the Netherlands and Belgium provided dredging services in the Gulf of Ob in 2016–2017 [21].

The volume of extraction and export of natural resources has an impact on the development of Arctic ports. The cargo turnover of the seaports of the Arctic basin in 2020 decreased and amounted to 96.0 million tons (-8.4%), of which the volume of transshipment of dry cargo – 30.1 million tons (-4.9%), liquid cargo – 65.9 million tons (-9.9%). The leading position is occupied by the ports of the Western Arctic[8] which mainly provide year-round logistics support for navigation on the Murmansk – Dudinka route to support the activities of the MMC Norilsk Nickel group of companies, as well as carry out oil turnover from the Ob Bay and Varandei regions. These trends encourage the largest resource developers to invest in the construction of a specialized transport fleet (class no lower than

[6] At the Arctic forum, there were weighted the prospects for transit along the Northern Sea Route. Available at: https://sudostroenie.info/novosti/28839.html (accessed: March 31, 2021).

[7] Katysheva E.G. Gas industry of the Russian Arctic. *Neftegaz.RU*. 2020, no. 10, October. Available at: https://magazine.neftegaz.ru/articles/arktika/633267-gazovaya-promyshlennost-rossiyskoy-arktiki/ (accessed: February 15, 2021).

[8] Federal Agency for Sea and River Transport. Available at: http://www.morflot.ru/deyatelnost/napravleniya_deyatelnosti/portyi_rf.html

Arc7), in icebreaking supply and support vessels [22]. We will highlight the four leading ports in terms of cargo turnover from 2018 to 2020:

– Murmansk and Arkhangelsk providing diver-sified services;

– Sabbeta and Varandei providing multi-disciplinary services.

Port of Murmansk handled 56.1 million tons of cargo in 2020 (in 2019 it was 61.9 million tons, in 2018-60.7 million tons). The port of Arkhangelsk, despite its more favorable position, free year-round access to the World Ocean handled cargo by an order of magnitude less – 3.3 million tons (in 2019 – 2.7 million tons, in 2018 – 2.8 million tons). This is due to limited capabilities in terms of receiving ships entering the port, as well as the time of passage to the seaport[9] [23].

The port of Sabetta showed record growth rates in the volume of processed cargo – 27.8 million tons (in 2019 – 27.7 million tons, in 2018 – 17.4 million tons). This growth is due to the proximity to oil and gas deposits, as well as the growing volume of export supplies of liquefied natural gas from the Yamal LNG plant.

The port of Varandey (4.9 million tons) significantly reduced the volume of cargo turnover (by 31.8% compared to 2019), due to its mono-profile (the port is intended for the oil export produced in the north of the Nenets Autonomous Okrug by sea), and oil transshipment indicators decreased in 2020.

The forecast estimates of the growth of the NSR cargo turnover are related to the further development of Russian Arctic hydrocarbon projects. According to the May Presidential Decree, the NSR cargo turnover should increase to 80 million tons per year by 2024. According to the Federal Agency for Sea and River Transport in 2017, cargo traffic on this route increased by 42.6% and amounted to 10.7 million tons, by 2020, according to the agency, the volume of cargo transportation on the NSR should be 44 million tons (as of December 10, 2020, the total volume of traffic in the waters of the Northern Sea Route was 30 million 858.7 thousand tons), and it will have increased to 70 million tons by 2030. According to the estimates of the Ministry of Natural Resources, by 2024 the volume of cargo transportation via the NSR will have reached 52 million tons per year[10].

In March 2019, the Ministry of Natural Resources updated the forecast of the NSR cargo turnover, adding to it the volumes necessary for the implementation of the May presidential decree (82 million tons by 2024[11]). The main volume of cargo will be associated with the transportation of energy resources and other raw materials – liquefied natural gas, oil, coal, metals.

As a result, we can conclude that the current economic development of the regional space of the Russian Arctic is based on promising resource projects that form a cargo base and unite the territories of the Arctic regions around the Northern Sea Route *(Tab.)*.

Russia's Arctic space has huge reserves of energy and mineral resources in the same geographical locations ("where gas meets ore") which open up opportunities for additional on-site industrial processing in the future before shipping via the NSR.

In the field of ensuring vital activity of population from northern regions in the form of deliveries of the Northern territories (according to the letter of the law "early delivery of products to the regions of the Far North and equivalent areas"). In the framework of this work, we will not consider the specifics of the implementation of the northern delivery. However,

[9] For instance, to pass to the seaport of Arkhangelsk, it is necessary to spend a day on the passage of the White Sea, provided that there is no need for icebreaking wiring, for the passage to the port of Murmansk: about four hours. In this case, the conditions from the port of Murmansk are more attractive, as temporary losses can lead to an increase in the freight rate.

[10] Source: RBC Group. Available at: https://www.rbc.ru/business/16/01/2019/5c3dde2f9a79471715920f53

[11] *Ibidem*.

NSR resource projects

Business territory	Company	Type of activity (field)
Murmansk Oblast	PAO NOVATEK	CMP production, assembly and installation of modules of upper constructions
Nenets AO	Gazprom Neft PJSC	Oil output (Prirazlomnoye)
	LUKOIL	Stationary sea ice-resistant shipping berth (Terminal "Varandey")
New land	State Atomic Energy Corporation Rosatom	*It is planned to be developed*. Reserves of silver-containing lead-zinc ores of industrial categories for the conditions of their open-pit mining (Pavlovskoye field)
Yamala-Nenets Autonomous Okrug, Yamal Peninsula	PAO NOVATEK	Natural gas production and liquefaction (Arctic-LNG, Yamal-LNG)
	Gazprom Neft PJSC	Oil production (Novy Port field)
	LUKOIL	Oil production (Sandibinskoye field)
Krasnodar Krai	Rosneft Oil Company	Oil production (Vankor field)
	LLC "NNK-Taimyrneftegazdobycha"	Search, exploration and development of oil and gas fields, oil refining, and production and marketing of petroleum products (Payakh project)
	VostokCoal/ Arctic Mining Company (AMC)	Development of high-quality anthracite area (Lemberovskaya group)
	Nornickel	Production, complex gas preparation for transmission to the NPR gas transmission system (Pelyatkinskoye field)
	NAO "Severnaya Zvezda"	Production of coal concentrates from coking coals (Project for coal complex creation)
Republic of Sakha (Yakutia)	JSC "Zyryansky coal mine"	Open-pit anthracite mining (Zyryan opencast coal mine)
	Vostok Engineering	*It is planned to be developed*. Reserves of rare earth metals. (Tomtorskoye field)
Chukotka AO	"Mayskoe Gold Mining Company"	Gold mining (Mayskoye fold field)
	KazMinerals	It is planned to be implemented. Processing of copper and gold fields, copper concentrate production (Baim copper and gold project)
Source: own calculations based on information from the RBC news site and the official websites of the companies.		

the authors should emphasize that the Northern Sea Route is historically one of the most important components of the life support systems of the Russian Arctic regions. Free movement of goods throughout the country within the framework of the single economic space is one of the most difficult state tasks in Russia due to the size of the territories and geographical features. As some Russian regions do not have a year-round connection with the main centers of production of goods, primarily fuel and food, the state support system for early delivery of goods applies to these territories.

Delivery of the Northern territories is actually carried out entirely by water transport. For instance, about 15% of cargo volume related to the northern importation is delivered by sea, more than 85% – by river [4].

Conclusion

In conclusion, we should note that, in fact, in all strategic documents of Russia's development, the Northern Sea Route development is defined as the main direction of socio-economic development of the priority geostrategic territories of the Russian Federation located within the Russian Arctic zone. Moreover, it is considered in the concept of creating an international transport and logistics highway. The NSR development includes infrastructure provision of mineral resource centers, modernization and development of seaports that ensure its operation, and promotion of socio-economic development of strategically important settlements.

Inland navigation on the NSR will play a significant role in the future socio-economic development of remote Russian Arctic territories.

The Russian government has established eight Arctic development zones along the country's northern borders and has proposed several priority infrastructure projects (such as ports, terminals, railways, airports, and electricity transmission facilities) to support increased exploitation of natural resources and require year-round marine transport of energy and minerals.

The Spatial Development Strategy of the Russian Federation assumes the multidimensional development of the Arctic Zone within the established planning horizon (through to 2035) and highlights the features that determine special approaches to the socio-economic spatial development of this region and ensuring national security in the Arctic. The time interval of the Strategy falls on the era of global warming. This climate factor contributes both to development of new economic opportunities and to creation of additional risks for economic activity and the environment in the permafrost melting zones, and increases the ice-free space of the Arctic Ocean seas which contributes to the strengthening of the Arctic geopolitical potential.

So, in terms of transit cargo, first of all, it is necessary to highlight the problem of year-round navigation impossibility. Nowadays the NSR closes for year-round navigation, except the Ob Bay and the Yenisei River to the west through the Kara Sea. The lack of year-round navigation throughout the NSR is a problem for international shipping companies interested in regularly using the route as the shortest route for cargo transportation between Northeast Asia and northwest Europe and not considering changing their transport and logistics system for a route that is open only part of the year. The question of commercial use of the NSR remains open. An assessment of the flight costs, the passage time and the risks does not allow drawing a clear conclusion in favor of the NSR. However, implementation of the strategic development goals of the NSR transport and logistics system in the future will change the development vector of international transit transport.

As a result of studying transportation of raw materials, we can conclude that inland navigation is the dominant type of navigation on the NSR including about 76-92% of all voyages during the period. Most of the cargo transported on the NSR is domestic cargo, mainly export and coastal cargo. In the next few years, large volumes of Russian Arctic oil, LNG, coal, metals, ore, grain, and other natural resources will be transported by high-ice-class cargo ships from remote locations along the NSR to large Russian hubs or specialized transshipment terminals for temporary storage and transshipment. Achieving competitiveness in international transit transport will be possible on the basis of intensive development of domestic transport, as well as upon completion of the main projects for the Northern Sea Route development trough to 2035 including realization of the federal project "Northern Sea Route" (2018–2024), the launch of year-round navigation throughout the NSR (trough to 2030) and formation of a new international transport corridor by 2035.

Sea transport (together with limited air transport) plays a significant role in ensuring population's life, as it is the only route for delivery of goods, materials and fuel to almost 100 remote settlements on the Russian mainland Arctic coast, archipelagos and islands. The same applies to Arctic settlements along Russia's inland waterways that depend on river transport.

In general, shipping on the NSR is of great strategic and economic importance for Russia. The NSR acts as a transport corridor along its entire Arctic coast and as a gateway to the North Atlantic Ocean in the west and the North Pacific Ocean in the east.

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Rural Territories' Digitalization: from Theory to Practice*

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Abstract. Large-scale application of digital technologies in management, social, and business processes determines the relevance of the inclusion of digital transformation factors in the socio-economic potential assessment of territorial systems. However, the applied methods of analyzing digitalization processes do not allow reflecting the influence of multi-level spatial set of digital transformation factors of life spheres on the process of potential formation and development of the country and its regions. The purpose of the research is to substantiate the need to include digitalization factors in the assessment of the aggregate potential of territorial socio-economic systems, to develop and test a methodology for integrative impact assessment of digital transformation factors on the state and socio-economic potential growth of territorial systems. The author uses the methods of analysis and synthesis, comparison and grouping, generalization and expert assessments, index and correlation methods of economic and statistical analysis. The working hypothesis of the undertaken research suggests a possibility of developing and applying a methodological approach to the analysis of the state and dynamics of digitalization processes reflecting the interdependence of characteristics of rural territories' potential and digital transformation parameters of rural life sphere. The paper defines the concepts of digitalization and digital potential, gives an annotated list of the main methodological approaches to assessing the territorial system's potential, proposes and tests the author's methodology version for analyzing and evaluating digitalization potential of rural territories, substantiates the model of a single digital platform for the purposes of state strategic planning for sustainable development of rural territories, structures the set of directions for digital transformation

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of region's life subjects, and forms a multi-level set of indicators for comparable assessment of the state and dynamics of digital transformation development which is useful for developing options for setting priorities when justifying strategic decisions in digitalization. The scientific novelty of the research is that for the first time there was an attempt to develop a methodological approach to assessing territorial system potential taking into account the factors of digital transformation of processes in the field of production, exchange, distribution, and consumption of public products.

Key words: digital transformation, rural territories' potential, rural territories' digitalization.

Introduction

Achievement of the goals of Russia's socio-economic development is inextricably linked to a consistent implementation of digital technologies in management, social, and business processes. Starting with the IT sector, active use of digital technologies is a driver of sustainable economic development including agriculture that is the main employment area in rural territories.

Scientific research, related to the problem of growth and effective use of socio-economic potential of rural territories, indicates not only the urgent need to solve it, but also the positioning, on the one hand, of the factors and conditions for its resolution, and, on the other hand, the identification of priority areas for sustainable development of rural territories of the Russian Federation. In our opinion, we should also identify the third system-forming side: namely, innovative platform creation for building rural territories' potential and prerequisites for receptivity of rural economy and population to innovations (primarily the transition to digital, intelligent production technologies, robotic systems, new materials and construction methods, systems creation for processing large amounts of data, machine learning and artificial intelligence, etc.) within the framework of the implementation of the catch-up development paradigm and model of circular (waste-free) economy of agro-industrial complex. Based on this conceptual view, the author adopts the working research hypothesis which suggests possibility of developing and using a methodological approach to the analysis of the state and dynamics of digitalization processes in rural territories, reflecting the interdependence of characteristics of rural territories' potential and digital transformation parameters of rural life sphere.

The tasks of the research are: 1) to select a methodological approach to assessing rural territories' potential taking into account economic digitalization; 2) to develop a model for classifying rural territories by development level and tools' susceptibility for digital transformation of operating environment; 3) to justify a single digital platform for planning sustainable development of rural territories in the context of economic digitalization.

Scientific works note processes activation of domestic business inclusion in the global digital transformation which contributes to competitiveness growth. For instance, according to the Higher School of Economics, the overall business digitalization index in 2018 reached a value of 31 units[1]. The leading industries are telecommunications (index 41) and wholesale and retail trade (index 39). The share of gross domestic expenditures on digital economic development in the Russian Federation in 2018, compared to 2017[2],

[1] Abdrakhmanova G.I., Vishnevskii K.O., Golkhberg L.M. et al. *Digital Economic Indicators: 2020: Stat. Coll.* National Research Institute "Higher School of Economics". Moscow: NRI HSE, 2020. P 360.

[2] Abdrakhmanova G.I., Vishnevskii K.O., Golkhberg L.M. et al. *Digital Economics: 2020: Brief Stat. Coll.* National Research Institute "Higher School of Economics". Moscow: NRI HSE, 2020. P. 112.

increased to 3.7% of GDP, mainly due to an increase in the share of household expenditures on the use of digital technologies and related goods and services. In the structure of gross domestic expenditures for digital economic development, business sector (44.6%) and households (36.8%) have identified themselves on a large scale.

Population is more often using digital technologies: the share of households with the Internet access (as a percentage of total number of households) has increased from 48.4% in 2010 to 76.6% in 2018, with 68.8% of residents using the Internet every day. The level and range of digital population's skills are expanding (despite the existing low level in relation to other countries). 54% of the surveyed citizens have a positive attitude to robotics, noting that robots are a good thing for humanity (they can serve as assistants in household chores – 66%, deliver goods from stores – 62%, and be legal consultants – 53%). At the same time, 89% of population aged 18–65 years believe that robots can perform work that is too heavy or dangerous for humans.

The agro-industrial complex is expanding the range of applications of intelligent technologies, primarily unmanned vehicles and aircraft, tractors, indicators and sensors, as well as GLONASS / GPS systems and IoT platforms. In addition to automation (robotization) and visualization of production processes, real-time update of information. The main advantage in this case is the ability to enter into economic circulation of hard-to-reach territories.

Information and communication technologies are used by 89.5% of business organizations in the Russian Federation, 86% of them have broadband Internet. In 2018, 90% of business organizations had access to the Internet, but only 49% of them had a website. Authorities are more active in the ICT usage (97.6% is regional authorities, 95.1% – local governments).

According to the research materials of the Higher School of Economics[3], 19.9% of organizations use the Internet for purchases, 15.4% – for sales. Cloud services are used by 36.4% of organizations in the telecommunications sector, 36.2% in wholesale and retail trade, and 35.5% in the information technology industry. Business software is mainly used for financial calculations (57.7%). State and municipal services are received in electronic form by 54.5% of the population aged 15–72 years, and 68.3% of organizations are in the business sector. The business sector prefers to work with authorities in online interaction form for sending and downloading official forms, obtaining information from the websites of state authorities. In the ICT sector in the Russian Federation, the share of employees is 1.6% of a total number of employees, the contribution of the ICT sector to economic development was 14.3% of the GDP in trade in 2018, 3.2% is in agriculture.

The aforementioned characteristics of digitalization directions are based on official sources of statistical information and are not divided by subjects of urban and rural areas, as the Rosstat does not group them on this basis. Only some municipalities make independent, proactive attempts at differentiated analysis and assessments.

It is well known that socio-economic processes occurring in rural areas are influenced by the specifics of the conditions for production implementation, its territorial dispersion, highly specialized nature of economic activity, peculiarities of living in rural areas and territories' inaccessibility. Digital technologies development depends not only on the need to strengthen the competitive position, i.e. the action of the market mechanism, but also on the tasks of ensuring acceptable living standards for population. Farming, in addition to

[3] Abdrakhmanova G.I., Vishnevskii K.O., Golkhberg L.M. et al. *Digital Economics: 2020: Brief Stat. Coll.* National Research Institute "Higher School of Economics". Moscow: NRI HSE, 2020. P. 112.

the goals of agribusiness and achieving benefits, is more driven by the task of survival. This requires the representation of agriculture primarily as the habitat of rural residents. It is worth noting that currently there is degradation of socio-economic sphere and partial socio-economic "desertification" of rural territories, the all-Russian trend of reducing the share of rural residents in the total population continues.

The content of the formation processes and emerging characteristics of socio-economic potential of rural territories undoubtedly determine pace and possibilities of using digital technologies, but, simultaneously, they require tracking and studying these trends, analyzing and assessing the degree of demand and readiness for digital transformation of socio-economic processes, identifying the prerequisites for the use of digital technologies in the management of rural development.

Theoretical and methodological aspects of the research

In scientific research, there are several approaches to interpreting "rural territory" concept. For instance, from the point of view of sociology and geography, rural territory means, first of all, human activity zone and, to a lesser extent, the field of economic activity or administrative borders [1]. Rural territory is also represented as a system consisting of two subsystems – a social subsystem and a subsystem of territories that closely interact with each other[4]. RAS Academician Kuznetsov V.V. defines rural territory as an area of rural settlements including urban settlements that are an administratively part of rural municipal districts [2].

Most authors consider rural territories complex socio-economic systems, represented by rural settlements and adjacent inter-settlement territories with their characteristic low population density, mandatory availability of agricultural land and other natural resources [3; 4; 5]. Several scientists present rural territory as an area located outside of large towns having diverse resource potential with certain conditions for its use, the presence of basic production assets similar to the territory's industrial structure, and rural residents with their own way of life and culture [6; 7; 8].

In the Government Decree of the Russian Federation no. 696, dated May 31, 2019 (as amended on July 10, 2020), "On Approval of the State Program of the Russian Federation "Integrated Development of Rural Territories", rural territories are understood as rural settlements or rural settlements and inter-settlement territories united by a common territory within the boundaries of a municipal district; rural localities that are a part of urban settlements, municipal districts, urban districts (with the exception of urban districts, on the territories of which the administrative centers of the entities of the Russian Federation are located); rural localities that are a part of the inner-city municipalities of Sevastopol; workers' settlements that have the status of urban settlements; workers' settlements that are a part of urban settlements, municipal districts, and urban districts (with the exception of urban districts where the administrative centers of the entities of the Russian Federation are located). In the current study, the author relies on this definition.

In the conventional sense, "potential" is reduced to a designation of opportunities for further use for development. In relation to territory's potential, it is an open-type system, the main structural elements of which are natural conditions and the environment state, population and the quality of labor resources, the amount of fixed capital and the level of technological production equipment, application scale of the results of scientific and technological progress, regional geopolitical conditions, auxiliary and social infrastructure [9; 10]. Other scientists emphasize

[4] *Sustainable Development of Rural Territories: Scientific Studies of Nikonov ARAPI*. Ed. by Petrikov A.V. Moscow: Nikonov ARAPI, 2009. P. 272.

that development potential of rural territory is a set of natural, economic, social, national, human (labor, demographic) resources that ensure the sustainable socio-economic development of the territory, its competitiveness and positioning in the domestic and global markets on the basis of expanded reproduction in accordance with economic laws and legal conformities [11].

From the point of view of the tasks of social management, rural territories are a platform not only for the sphere of production, but also for the social sphere, and therefore the author focuses on the mandatory consideration of the potential of the territory in terms of opportunities for creating comfortable living conditions for population, developing infrastructure, and improving the quality of life of rural residents. In modern conditions, rural development potential should be considered as the ability to long-term (long-term) sustainable functioning, ensuring competitive advantages in the domestic and foreign markets, based on the strategy of innovative and technological development. Numbers are inseparable from the strategic management.

The term "digital economy" was first used in 1995 by N. Negroponte [12; 13; 14], who designated the concept of electronic (digital) economy. According to Professor R.M. Meshcheryakov, on the one hand, the digital economy is based on digital technologies in the field of sales of goods and services, on the other – it is economic production using digital technologies[5]. In a narrow sense, the digital economy is understood as a type of commercial activity carried out in the electronic space. In a broad sense, it is the entire society transformation against the background of introduction of information and communication technologies [15].

Digital economy is a model reflection of economic relations of production, distribution, exchange and consumption based on information and communication technologies [16; 17]. The field of interests of the digital economy is personnel and education, information infrastructure, information security, legal regulation [18]. Professor A.V. Minakov believes that digital economy is the economy based on computer technologies covering all life spheres and focused on a consumer in order to improve provision of services in trade, transport, medicine, education, culture and other areas, operating with information stored in databases [19]. According to the departmental project "Digital Agriculture"[6], digital economy is an economic activity based on digital technologies related to e-business and e-commerce, electronic goods and services produced and sold by them.

The variety of approaches of modern scientists to the content of the "digital economy" definition forms a variety of opinions on understanding the "digitalization" category. According to Professor L.V. Lapidus, digitalization is a transition process to a digital region, transformation of processes of cross-regional, intersectoral, interpersonal interaction in the region due to the penetration of digital technologies, aimed at improving population's quality of life, competitiveness of the Russian economy, ensuring national security and sovereignty of the country [20]. Digitalization is also considered a new product creation in digital form with new properties and competitive advantages [21; 22].

From the standpoint of state regulation of socio-economic processes, we can argue that digitalization indicates economic formation in which technologies are used to initiate certain actions without human

[5] R. Meshcheryakov explains: "Currently, some experts believe that it is necessary to expand this understanding and to include the chain of goods and services that are provided using digital technologies, including such concepts as the Internet of Things, 4.0 Industry, smart factory, fifth-generation communication networks, engineering prototyping services, etc." [Which is more important: real or digital economy?]. *Information and Analytical Center (IAC),* dated September 12, 2017. Available at: http://inance.ru/2017/09/cifrovaya-ekonomika

[6] *Departmental project "Digital Agriculture": official edition*. Moscow: FGBNU "Rosinformagro-tech", 2019. 48 p.

intervention, that is, so-called smart production systems are formed, where all subsystems (resources, equipment, logistics, marketing and other schemes) are covered by a single communication network which greatly expands the possibilities to improve the production process stages, reduce production costs, improve management efficiency and respond flexibly to new customer requests. The merging of online and offline spheres, development of the Internet and mobile communications are the "basic technologies of digital economy", their introduction in all spheres of activity is caused by a rapid spread of touch devices and large databases [23; 24].

In our study, we understand rural territories' digitalization as transformational processes of promoting digital technologies in the course of rural development and managing life sphere of rural population for effective use of rural territories' potential, creating modern jobs and comfortable living conditions for people, sustainable economic growth and improving living standards.

Substantiation of the methodological approach to assessing rural territories' potential in the context of digital society transformation

Territorial system potential is formed under the influence of many multidirectional factors. To measure its accounting, the methodology of scientific research includes a number of developed and tested approaches. They allow not only evaluating it, but also identifying development trends and predicting prospects.

The sectoral approach to assessing rural territories' potential [25] is based on an assessment of sectoral growth elasticity for each studied industry, the level of its intensification and investment attractiveness which ultimately allows using cluster analysis to express an indicator of territories' socio-economic potential.

Index approach [26; 27] is based on application of a set of not only socio-economic indicators, but also indicators of related areas that have a direct impact on the sustainability of territorial development reflecting the strengths and weaknesses of the socio-economic situation of a particular territory.

The indicative approach to assessing the organizational and economic potential of rural territories [28; 29; 30] takes into account, in addition to the investment capital and natural resource base, living conditions of rural population, includes operations for ranking indicators and calculating the overall integral indicator of rural territories' competitiveness (based on individual indices).

Resource approach to assessing rural territories' potential is based on the use of closed one-point scale, followed by the calculation of the integral indicator for the resource block taking into account the correction factors. This allows displaying the specialization nature of production activities taking into account the resource intensity of individual branches of the agro-industrial complex, to express the need for material investments in the resource base for the long term, to build optimization models in the distribution processes of public and private investments [31].

S.V. Baramzin's approach [32] includes determining the rating (with interval ranking) of rural territories based on a set of indicators of economic, social, and financial condition, forming intermediate results of assessments and the possibility of integration into the consolidated rating of a rural settlement.

Social potential assessment of rural infrastructure [33] is carried out by means of satisfaction coefficients based on the measurement of the human development index (HDI) and conducting sociological monitoring of the quality of regional management ("Quality Rose" method) by identifying "problem" social zones.

The integral approach to assessing rural territories' potential, used by a group of authors [34; 35; 36], is based on the calculation of

generalized integral indicator of socio-economic development level that is tracked according to Rosstat.

Each of the aforementioned methodological approaches has its own advantages and limitations, but, at the same time, allows more or less translating general and special in assessing municipalities' potential as a whole. However, their common disadvantage is the lack of a statistical base for studying the potential of a particular rural area. Statistical information, used by individual scientists (as reference points for calculating the potential) for rural territories, has a narrow range of indicators, and is subject to constant changes in reporting forms (since 2014). This, in turn, leads to the complication of research activities, limited analysis capabilities, which, in relation to the tasks of implementing the country's innovation development strategy, imposes additional difficulties in forming database.

It is necessary to state that there is still no active orientation of the methodological tools to the tasks of studying interdependence of digital transformation processes and the potential state of national and regional socio-economic systems.

Nevertheless, orientation issues of methodological approaches to the study of innovative development problems are beginning to attract the attention of state statistical services. Digitalization puts the task of tracking these processes by statistical services on the agenda. In particular, the working group of the Organization for Economic Cooperation and Development has prepared proposals for the structure of digital economy satellite account, the main objectives of which are to 1) provide users with a sufficiently reliable assessment of what is measured in the digital economy, 2) determine what cannot be measured within the current methodology, 3) enable international comparisons of key indicators describing digital economy [37].

Based on the research tasks, we propose a methodological approach development to assessing rural areas' potential. It is based on the use of a number of provisions of the methodological approaches, discussed above to the potential analysis of territorial systems and methodological tools for assessing digitalization, tested in studies of the Institute of the Information Society (IIS), reviews of the World Bank and the Analytical Center for the Government of the Russian Federation.

We emphasize that digitalization of interaction processes in the socio-economic territorial system creates, through penetration of digital technologies, opportunities to increase economic competitiveness, increase the level and quality of population's life, contributes to creation of new products and services (or their digital forms) and, in the same way, acts as a structural formation element of new level of territorial system's potential. Covering production subsystems (resources, equipment, transport and logistics and marketing modules), a complex of industries of production and social infrastructure, as well as organization and management process, digitalization is a new potential component of the territorial and spatial system.

Therefore, it is possible to talk about digital and non-digital components of potential, respectively, about digital and non-digital criteria for its assessment, to develop and test models and methods for measuring the impact of, for example, tools and processes of digitalization on the growth of socio-economic potential of the territorial system, or to identify its readiness (perception) degree for digital transformation.

In the current study, on the basis of the indicated methodological approach, the author tries to study rural territories' potential, based on characteristics that reflect: 1) availability of rural territories with resources; 2) susceptibility of enterprises (organizations) of territorial system to innovation; 3) possibility of implementing (using) digital technologies in the economy and management, the market potential of which meets the needs of society to form a level and quality of life that meets modern

standards. A comprehensive assessment of rural territories' potential involves, first, the formation of a system of indicators; second, availability and maintenance of information database for calculating indicators; third, a possibility of applying assessments for the purposes of state strategic management.

The author's approved methodology includes five consecutive stages for assessing rural territories' potential. At the first stage, a system of indicators for assessing rural territories' potential is formed using single indicators. At the second stage, the indicators are analyzed in relation to rural territorial entities (the considered municipal district). At the third stage, the values of indicators are differentiated relative to the base levels. The fourth stage involves determination of the weighting coefficients of the values of indicators (according to expert assessments). At the final stage, an integral indicator for assessing rural territories' potential is calculated.

The assessment of rural territories' potential is made according to the totality of its components: 1) social and infrastructural potential (SIP), 2) economic and environmental potential (EEP), 3) digitalization potential (DP). To differentiate values of indicators relative to the base levels, we use the formula:

$$К1_n = \frac{К1_{ij}}{К1_{rf}}, \quad (1)$$

where $К1_n$ – normative value of *i*-th potential indicator;

$К1_{ij}$ – actual value of *I* potential indicator of *j* rural territory;

$К1_{rf}$ – base value of *I* potential indicator (the regional average value of the indicator is used as the base indicator).

To determine the values of the components' integral indicator of rural territories' potential, the article uses the following formulas:

$$SIP = \sqrt[n]{\prod_{i=1}^{n} SIP_i}, \quad (2)$$

$$EEP = \sqrt[n]{\prod_{i=1}^{n} EEP_i}, \quad (3)$$

$$DP = \sqrt[n]{\prod_{i=1}^{n} DP_i}. \quad (4)$$

Formula for calculating rural territories' potential (RTP):

$$RTP = a_i \cdot SIP + a_i \cdot EEP + a_i \cdot DP, \quad (5)$$

where SIP – social and infrastructural potential;
EEP – economic and ecological potential;
DP – digitalization potential;
a_i – weight factor for a particular i-th potential.

Grouping of rural territories by the level of their potential will be made in the range of the following values: high level of rural territories' potential is more than 0.65, average level – 0.36–0.65 inclusive; low level is less than 0.36.

Using economic and mathematical tools to justify the significance of the selected factors of digitalization potential, we calculated the Pearson pair correlation coefficient which characterizes the relationship tightness between the indicators. T-statistics confirm the significance of the linear correlation coefficient. At the same time, the GDP of a particular entity of the Russian Federation was used as the resulting indicator that characterizes the socio-economic potential. The correlation analysis showed a high close relationship between twelve of the thirty-three factors of digitalization potential which were later included in the assessment. The results confirmed the hypothesis of the study that digitalization potential has a significant impact on the level of territories' socio-economic development.

Judging by the values of correlation coefficients, the greatest influence is exerted by such indicators, presented in descending order, as:

– number of personal computers used for educational purposes, with Internet access, per 100 students (students) in educational institutions (0.86);

– share of fundamentally new technologies in the total number of advanced production technologies developed (0.85);

– share of organizations that implemented technological innovations in the total number of the surveyed organizations (0.81);

– number of fixed broadband Internet subscribers per 100 population (0.76);

– share of organizations that used local area networks in the total number of surveyed organizations (0.74);

– share of organizations that used the ERP systems in the total number of organizations surveyed (0.72);

– number of mobile broadband Internet subscribers per 100 population (0.71);

– share of organizations that had special software tools for managing the procurement of goods (works, services) in the total number of organizations surveyed (0.69);

– share of organizations that received orders for manufactured goods (works, services) via the Internet, in the total number of the surveyed organizations (0.69);

– share of organizations that placed orders for goods (works and services) on the Internet in the total number of the surveyed organizations (0.67);

– share of organizations that used means of protecting information transmitted over global networks in the total number of the surveyed organizations (0.65);

– share of organizations that used CRM systems in the total number of the surveyed organizations (0.65).

Pattern for measuring and evaluating digitalization potential of the territorial system

Digital transformation processes, currently taking place in all spheres of socio-economic activity, are a key component in the organization of effective interaction between business structures, subjects of the scientific and educational community, the state and citizens, thereby creating opportunities for growth and development of territorial system's potential. The nature of the digitalization impact is determined by the capabilities of the entire set of available resources of subjects engaged in digital transformation, the skills and abilities of its actors in the current and projected periods. We should talk about digitalization potential which is an integral part of territorial system's potential.

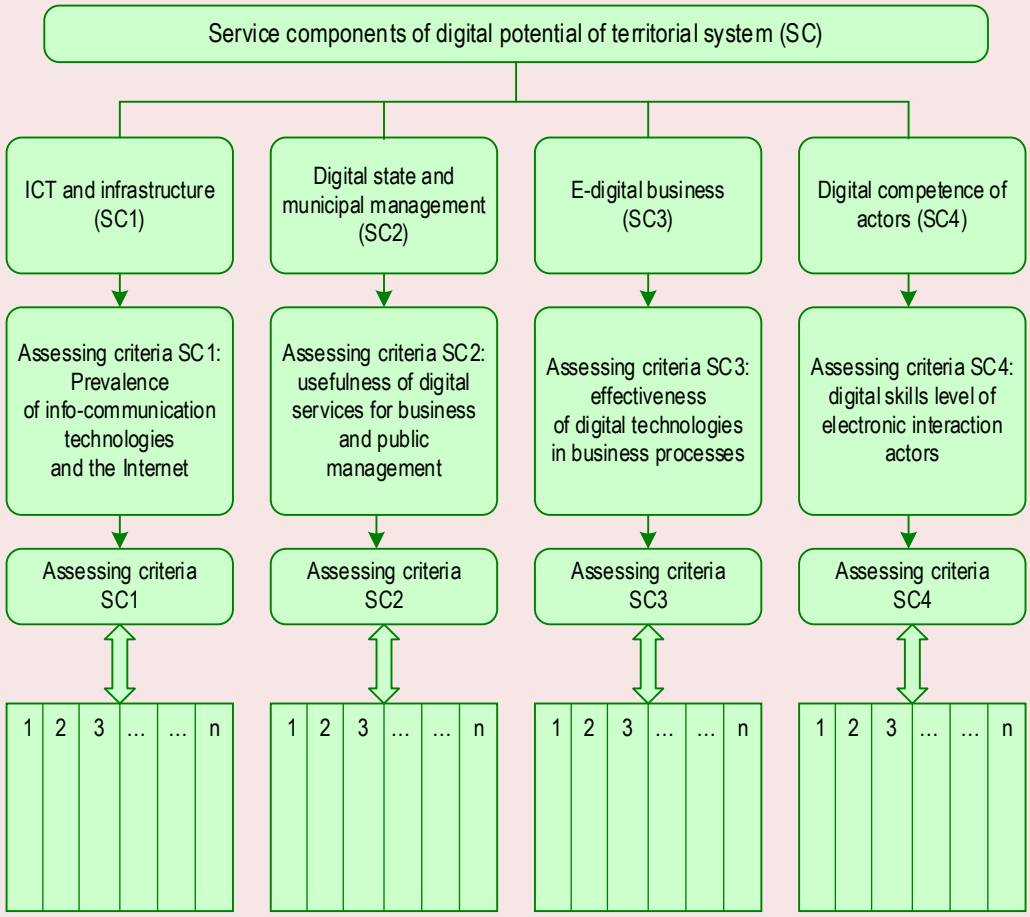
A review of recent scientific publications shows that domestic authors consider digital potential only in relation to industrial enterprises. For instance, N.V. Gorodnova, D.L. Skipin, A.A. Peshkova [38] clearly indicate the unity of three components: 1) resources; 2) company's internal capabilities to implement certain stages of information technology development cycle; 3) functional activity areas in which information technologies can be used. A.V. Kozlov and A.B. Tesli [39] propose to measure digital potential of an industrial enterprise using an integral indicator that reflects the current level and future opportunities for the use of digital technologies by the enterprise taking into account the conditions of external environment. Studies on the assessment of the digitalization potential of national and regional territorial entities remain sporadic (see, for example, [40]), and there are practically no studies on rural territories.

We propose to consider digital potential of territorial education in a general form – as a combined possibility of the available information and communication technologies, scientific, educational and information, and communication infrastructure, as well as the existing skills and abilities of people involved in the digital transformation of processes in all life spheres.

To solve the problems of analyzing and evaluating digital potential, we transform its theoretical formulation into an organizational and functional representation by means of a modular-factor representation *(Fig. 1)*.

The assessment uses quantitative and qualitative, financial and non-financial, industry and general economic, absolute and relative indicators which allows expressing explicit and hidden relationships in digital modernization processes at the macro and micro levels, to identify the current state of digitalization potential.

Figure 1. Organizational and functional module for assessing digital potential of territorial system



Source: own calculations.

Table 1. Assessment of rural territories' potential taking into account economic and management digitalization in municipal districts of the Vologda Oblast (as of January 1, 2019)

High potential	Average potential		Low potential
Vologodsky Gryazovetsky Kaduysky Sheksninsky Cherepovetsky	Babayevsky Babushkinsky Velikoustyugsky Verkhovazhsky Vozhegodsky Kirillovsky Kichmengsko-Gorodetsky	Mezhdurechensky Nikolsky Sokolsky Totemsky Ustyuzhensky Kharovsky Chagodoshchensky	Belozersky Vashkinsky Vytegorsky Nyuksensky Syamzhensky Tarnogsky Ust-Kubinsky
Source: own calculations based on Rosstat data and expert assessment.			

Taking into account factors of economic and management digitalization the results of level assessment of rural territories' potential are presented in *Table 1*.

We should note that only five municipal districts of the region, or 19.2%, have a high potential level taking into account economic and management digitalization, seven regions (26.9%) are with low potential, fourteen (53.9%) – medium.

On the basis of the composite index of assessments of the potential and degree of readiness of territorial systems for digitalization, it is possible to structure them in order to plan state support for sustainable rural development.

According to many Russian scientists, territories' structuring (zoning) is not only a tool for assessing the growth rate (decline) of population's economy and living standards [41–43], but also a way of proving management decisions made on territories' development [44; 45].

Based on the obtained data of potential assessing for digitalization of rural territories, we will structure them to determine the digital readiness of territorial system and its digital environment state *(Tab. 2)*.

Further, we will build the matrix "digital readiness level – digital environment of rural territories" *(Fig. 2)*.

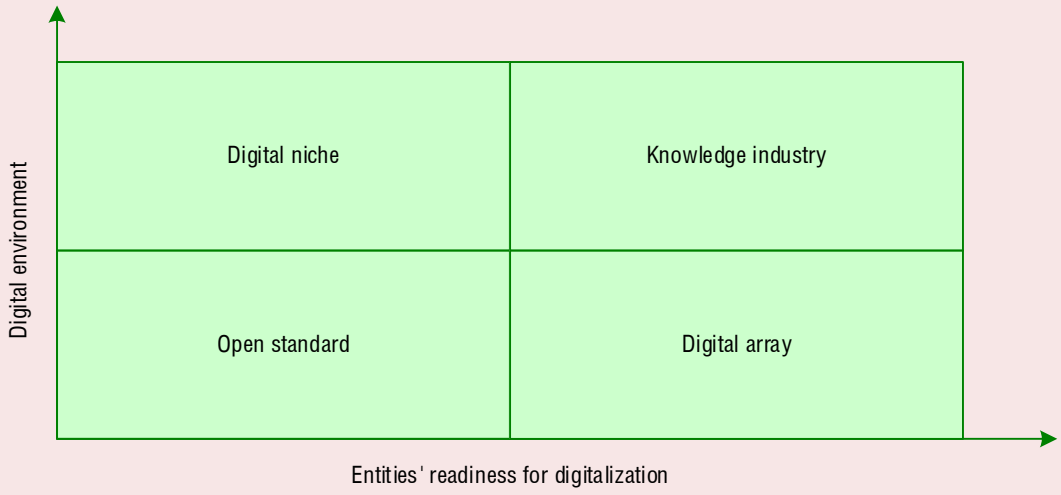
According to classification results, we have identified four rural local digital zones. The "Open Standard" group includes rural territories with a low level of digital environment and entities' readiness for digitalization. The "Digital Niche" group includes rural territories with high digital environment level and low level of entities'

Table 2. Grouping of rural municipal districts of the Vologda Oblast by level of digital environment formation and readiness for digitalization

		Digital environment formation level		
		Low	Average	High
Digitalization readiness level	High	Sokolsky Gryazovetsky Kaduysky	x	x
	Average	Kirillovsky Totemsky Kichmengsko-Gorodetsky Kharovsky Chagodoshchensky	Vologodsky Cherepovetsky Sheksninsky	x
	Low	Belozersky Vashkinsky Vytegorsky Nyuksensky Syamzhensky Tarnogsky Ust-Kubinsky	Babayevsky Babushkinsky Velikoustyugsky Verkhovazhsky Vozhegodsky Mezhdurechensky Nikolsky Ustyuzhensky	x

Source: own calculations.

Figure 2. Rural digital readiness matrix



Source: own calculations.

readiness for digitalization. The "Digital Array" group covers rural territories with low digital environment level and high level of readiness of subjects for digitalization. The "Knowledge Industry" group represents rural territories with a high level of digital environment and entities' readiness for digitalization. For each rural local digital environment, the matrix allows structuring the corresponding development directions *(Tab. 3)*.

Rural territories' classification will help to implement a differentiated approach to making strategic decisions on the distribution of regional financial resources for territories' development.

Digital platform and rural development

According to the foreign scientists [46–49], digital platforms represent a new era and are able to effectively coordinate the interaction between spatially dispersed agents, forming the basic

Table 3. Directions of state regulation and rural development support by types of rural digital environment

Type of rural digital environment (RDE)	Characteristic of digital environment	Forms and directions of state regulation and support for rural digitalization development
Open standard	Rural territories with low readiness degree for digitalization and low digital environment level	✓ Program formation for digital potential development of rural area. ✓ Municipal programs' development for digitalization of rural territories. ✓ Implementation of regional software programs. ✓ Forms' development (opportunities' creation) for entities' remote functioning. ✓ Social and industrial infrastructure development in rural territories. ✓ Digital projects' financing in the "People's budget" program. ✓ Digital potential development of population's though municipal education system. ✓ Expansion of PPP directions in implementation of digitalization tasks.
Digital niche	Rural territories with low readiness degree for digitalization and high digital environment level	✓ Organization of competitions (grants) at the federal level for territories' digitalization. ✓ Organization of competitions (grants) at the regional level for territories' digitalization. ✓ Implementation of regional programs to attract programmers to work in rural territories. ✓ Tax benefits for involved in implementation of digitalization projects at the municipal level. ✓ Search for investors, ideas to enhance the use of territory existing potential. ✓ Organization of competitions (municipal contracts) to search for the effective options of use for land resources. ✓ Grant support to industries for innovative technology production (digital technologies) in production structures.
Digital array	Rural territories with high readiness degree for digitalization and low digital environment level	✓ Creation of pilot digital platforms. ✓ Subsidizing introduction of digital technologies in production. ✓ Digital projects' financing in the "People's budget" program. ✓ Competitions (municipal contracts) to search for the effective use of land resources. ✓ Grant support to industries for innovative technology introduction (digital technologies) in production structures.
Knowledge industry	Rural territories with high readiness degree for digitalization and high digital environment level	✓ Assistance (participation co-financing) in federal programs for digital economic development. ✓ Support for talented young people in rural territories. ✓ Projects' support to develop artificial intelligence and attract scientific research. ✓ Experience popularization of rural development and effective interaction forms with the territories of the "Open standard" group.
Source: own calculations.		

infrastructure of economic and social relations. In its most general form, digital platform is a virtual platform that provides interaction between two (or more) users (user groups) according to certain rules.

According to the departmental project "Digital Agriculture of the Russian Federation", a digital platform is, first, a group of technologies that are used as a basis for creating a specific and specialized system of digital interaction; second, a breakthrough innovation which is an integrated information system that provides multi-sided user interactions for the exchange of information and values leading to reduction in overall transaction costs, optimization of business processes, and increased efficiency of supply chains of goods and services.

Digital platforms are being actively implemented in both state and industrial structures: a digital platform is being developed to consolidate data from agricultural producers in order to form a general picture of agricultural production, the transition to combines with the Internet of Things modules, GPS/GLONASS systems and unmanned mode capabilities, monitoring the state of arable land from satellite, studying digital traces are being implemented. The Smart Region Program provides for transport sector development based on the data flow from the GLONASS sensors, information about traffic congestion forming an array of big data for solving transport problems.

In the regions, in order to digitally transform agriculture through the use of digital technologies and platform solutions to ensure a technological breakthrough in the agro-industrial complex and achieve productivity growth in "digital" agricultural enterprises, the national platform for digital public management of agriculture "Digital Agriculture" is being implemented which is a digital platform integrated with digital sub-platforms for managing agriculture at the regional and municipal levels.

Due to the development of digital technologies and creation of digital platforms, we propose to form a single digital platform "Rural Territories' Digitalization" in order to plan sustainable development of rural territories in the context of economic digitalization.

Project digital platform "Rural Territories' Digitalization" will combine two types of digital platforms (according to the classification, developed by the participants of program implementation of "Digital Economy of the Russian Federation", led by B.M. Glazkov [50]): infrastructure and applied. The aim of the applied platform nature is to exchange certain economic values in rural territories; and aim of the infrastructural nature is to provide IT servers and information for the authorities to make municipal/regional management decisions.

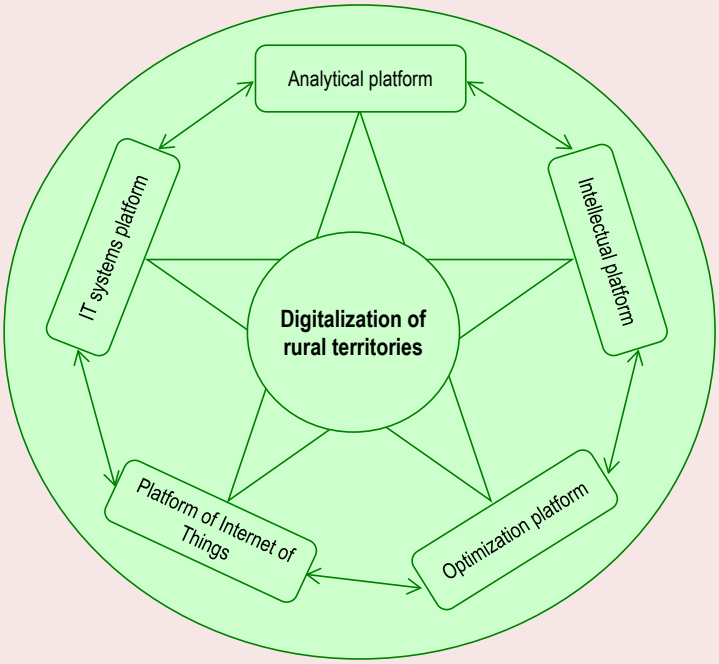
Classic digital platform includes five main blocks: 1) traditional IT systems: data centers and networks that are being upgraded to include a digital platform; 2) interaction with users in digital form; 3) the Internet of Things; 4) analytics, machine learning and artificial intelligence; 5) ecosystems as the basis for interaction in digital world.

Project platform "Digitalization of Rural Territories" provides for the placement of certain information in the context of municipal districts for each rural territory. Using the five-block classical approach to building digital platforms, we will present the project version in the form of a block diagram *(Fig. 3)*.

Analytical platform block provides for the placement of such servers as an interactive map of rural territories in real time, data collection in real time, educational programs on digital economy, a database of municipal, regional and federal programs for economic digitalization, a map of the land areas of rural territories with their characteristics, a digital footprint, etc.

Intellectual site block hosts servers for interaction between subjects and users in the digital environment: platforms for goods' implementation produced in rural settlements, platforms for exchange and evaluation of ideas for territories'

Figure 3. Pattern of information and communication digital platform "Rural Territories' Digitalization"



Source: own compilation.

development, platforms for initiatives for rural territories' development, surveys of rural population, etc.

Optimization platform block is aimed at optimizing processes by combining data from existing platforms for making appropriate calculations and conclusions, for example, combining (integration, information collection) with the national platform "Digital Agriculture", "Rosstat Digital Analytical Platform".

The Internet of Things platform block includes modern digital technologies implemented in rural territories, data on the availability of possible digital technologies for rural territories: monitoring of road congestion, smart greenhouses, GLONASS systems, robotization of production and provision of services to population, medicine at a distance. In other words, the server is aimed at providing smart solutions for agriculture, transport, housing, medicine, education, daily life of local population, etc.

IT systems platform block includes data processing centers for generating forecast estimates (patterns) and scenarios for rural development, visualizing projects of strategic management decisions, calculating rural territories' potential, determining the level of their digital development, generating reports of heads of municipalities and rural settlements, and analyzing digital technologies implemented in the region.

Project platform provides for data integration with national digital public administration platforms that have been created and are currently being implemented.

Information and communication digital platform "Rural Territories' Digitalization" allows displaying in a single digital space all types of resources of the district, directions of their use, investment opportunities and state programs, options for applying the project approach. All platform information is formed in certain folders with demonstration of video image, for instance,

a certain resource, in real time, quantitative resource support indicating the possibilities of its growth and use at the moment, broken down by each rural territory of the district. To expand the platform's capabilities, it is filled with ideas and proposals from the rural population, representatives of government authorities, and investors interested in investing in these territories, development plans, projects implemented in the district with results for the current date, state and regional programs, and online calculators. Platform capabilities include online meetings and discussions, and decision-making. So, when selecting a specific tab, the platform reveals all types of resources, and then, for each type of resource in more detail, allows using the available potential for calculating planned values. The platform advantages are information openness and accessibility, single database (district potential, its use options, reporting of the heads of rural territories, development plans and forecasts), automation of the calculation of indicators, relationship of all factors of rural development in planning attracting investment, possibility of combining small projects in municipal programs.

Developed version of digital platform will serve as the basis for the use of rural development planning mechanism.

Conclusion

Exploration of the essence of the "digitalization" concept has shown that the scientific literature and management practice have not yet developed a complete understanding of it as a type of formed sphere of knowledge in economic theory and practice. The diversity of points of view on understanding the essence of digitalization stems from the many approaches of modern scientists to the content of the "digital economy" definition which is largely based on the use of digital technologies, but their penetration is not limited to the space of economic relations and involves their application in all human life spheres in the interests of increasing the level and quality of population' life ensuring national security and country's sovereignty. For the purposes of our research, territorial system's digitalization is understood as the process of promoting digital technologies in the socio-economic environment of its functioning and in the management of life sphere for effective use of its subjects' potential, creating modern jobs and comfortable living conditions for people, sustainable economic growth, and improving population's living standards.

Active use of digital technologies, starting with the IT sector, acts as a driver of socio-economic development accompanied, according to analysts, by positive (reducing unit costs for production, creating prerequisites for economic growth and improving the quality of services) and negative (increasing threats to information security and job cuts, increasing inequality) effects that require analysis and evaluation.

The applied methods of analyzing digitalization processes allow expressing its functional content and subject-target orientation of influence tools in a certain period, but are not able to display systematically the influence and effectiveness of multi-level spatial set of factors that characterize the state of digital transformation of life spheres and dynamics of changes occurring in digital environment of the country and its regions. This implies the need to improve theoretical and methodological tools for analysis and comparable assessments of the state, development and effectiveness of the promotion of digital technologies in management, social and business processes.

As a result of the review of scientific research materials related to digitalization problem, in general, we can argue that digital transformation of interaction processes in the socio-economic territorial system forms, through penetration of digital technologies, opportunities to increase economic competitiveness, increase the level and quality of population's life, contributes to

the creation of new products and services (or their digital forms) and, in this way, acts as a structural formation element of a new level of territorial system's potential. Covering production subsystems (resources, equipment, transport and logistics and marketing modules), a complex of industries of production and social infrastructure, as well as organization and management process, digitalization is a new potential component of the territorial and spatial system. Moreover, as observations show, the processes of digital transformation, currently taking place in all spheres of socio-economic activity, are becoming a key component in effective interaction management between business structures, subjects of the scientific and educational community, the state and citizens, thereby creating opportunities for growth and development of the territorial system's potential. The nature of digitalization impact is determined by capabilities of the entire set of available resources of subjects engaged in digital transformation, skills, and abilities of its actors in the current and projected periods.

A review of recent scientific publications shows that domestic authors consider digital potential only in relation to industrial enterprises. Studies on the assessment of digitalization potential of national and regional territorial entities remain isolated, and there are no studies on rural territories.

In the current study, we propose to consider digital potential of territorial education in general as combined possibility of existing information and communication technologies, scientific, educational and information and communication infrastructure, as well as the existing skills and abilities of people, involved in digital transformation of processes in all life spheres. The article transforms this theoretical formulation into organizational and functional representation by means of its module-factor representation for solving analysis problems and digital potential evaluation.

Using economic and mathematical tools, designed to justify the importance of the selected factors of digitalization potential, we have calculated the Pearson pair correlation coefficient. It has showed a high close relationship between ***twelve of the thirty three*** factors of digitalization potential in Russia's regions. As a result, the paper confirms the accepted hypothesis of the research that digitalization potential significantly affects socio-economic development level of the territorial system.

In the course of the study, the author has grouped the Vologda Oblast rural municipal districts according to the formation level of digital environment and readiness for digitalization, has assessed the potential of the Vologda Oblast rural municipal districts taking into account economic and management digitalization (as of January 1, 2020), has constructed a matrix that reflects the dependence "digital readiness level – digital environment of rural territories". The research has identified the directions of the state regulation and support for rural territories' development in relation to the types of rural digital environment, and has proposed the pattern of information and communication digital platform "Rural Territories' Digitalization".

The pattern made it possible to create digitalization profile and structure a set of directions of digital transformation of life sphere subjects, as well as to express the nature of changes in the digital landscape over a certain period. Thereby, it becomes possible to form a multi-level set of indicators for comparable assessment of the state and dynamics of digital transformation development, to improve the analytical base for developing options for setting priorities when justifying strategic decisions in the field of digitalization.

Thus, in relation to the regional level, development and test of methods for the integrative assessment of digital transformation of processes in the field of production, exchange, distribution, and

consumption of public products make a certain contribution to the development of methodological approaches to assessing territorial systems' potential in the context of economic digitalization. However, we have to state that there is still no active orientation of the methodological tools to the tasks of studying the interdependence of the processes of digital transformation and the potential state of national and regional socio-economic systems which makes it necessary to carry out further research in the chosen field of scientific research.

Practical significance of the work is to use the assessment results of rural territories' potential in making management decisions at the municipal and regional levels in order to develop territorial systems, budget resources planning in the format of using project management and digital platforms for collecting information, making forecast calculations, establishing mechanisms of interaction in the "business – government – population" chain and forming competitive advantages of rural territories.

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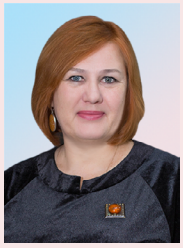
Preserving Children's Health: Search for the Ways of Solving Relevant Issues*



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Abstract. Changed social reality, caused by the coronavirus pandemic (COVID-19), made attention to population's health, its risks, and defining factors relevant. Nowadays, an individual's personal responsibility for own health and coherence of various social institutions' activities in the formation of children's health are of particular importance. The article is devoted to an analysis of children's health and search for the ways of its improvement. The authors explore the issues of availability and quality of medical services, safeguard of children's health and discuss the barriers to inter-institutional cooperation in this field, as well as ways of overcoming them. To achieve these objectives, we used quantitative and qualitative sociological methods: a sociological survey of families with children aged 3–17 years, monitoring observation of cohorts of families with children, focus group studies of parents of children aged 3–17 years, an expert survey of specialists of the regional health system and members of government authorities. The authors reveal several issues: decline of children's health potential in growing; insufficient awareness of parents about the state, forms, and methods of preserving and strengthening children's health, discrepancy between parents' ideas about their own competence in this matter with reality; lack of narrow-profile specialists in children's medical institutions; absence of medical workers among full-time staff of educational organizations; queues and complexity of making appointments with specialists; low availability of free and high cost of paid medical services; insufficient information interaction between medical, educational organizations and parents in the prevention of diseases; lack of parents' knowledge of full information about objectives of professional examinations and insufficient awareness of the importance of further actions to restore and strengthen health of children. Based on the analysis, we stated the areas of solving these problems. They may include the development and implementation of specific management tools to preserve children's health potential.

Key words: health, child population, institutes of healthcare, children's health, medical services.

Introduction

Health is a basic component of population's human potential [1, p. 96]. It is considered the main component of the child population's well-being [2; 3; 4]. Individually, the state of health in childhood determines subsequent stages of human development. Qualities acquired by an individual at that time, including the basics of health-preservation behavior [5], are kept throughout life [6, p. 94]. Along with a family, education, and child healthcare play an important role in protecting health of younger generation. Considering the priority of investments in human potential, the topic of children's well-being has been actively developed in foreign studies. This is a broad concept, the content of which remains the subject of scientific discussions [7]. Indicators of well-being (as applied to a child) include assessments of physical health, development and safety, psychological and emotional development, social development and behavior, cognitive development, and educational achievement [8]. As a case study of European countries shows, the GDP indicator explains less than half (47%) of the Child Well-Being Index variations. In order to assess the relationship between economic development and investment in the well-being of children, it is also necessary to take into account, in addition to economic parameters, social norms, institutions or indicators of the socio-political situation in the country [9]. Global research community is focused on a comprehensive study of children's well-being [10; 11], development of relevant methods for measuring it, allowing for cross-country comparisons [12; 13; 14]. Some progress has been made in the field of children's

opinions about what well-being means for them [15; 16]. Meanwhile, some aspects in this field remain insufficiently developed. For example, there is a lack of longitudinal studies of the impact of child well-being on the academic performance of school-age children [17].

Child population takes less than 25% in the structure of the current Russian population, which is a consequence of a low birth rate, which is insufficient to ensure simple population's reproduction [18], and the increase in life expectancy [19; 20]. As of January 1, 2019, a number of children, aged 0–17 years, was about 30.2 million people[1]. The implementation of an active federal and regional socio-demographic policy contributed to an increase in the birth rate [21; 22], which was observed until 2016 [23]. Thanks to these measures, the increase in the number of children in 2009–2019 amounted to 16 p.p. Maximum values of the indicator appeared in 2012–2015, and then it began to decline. Researchers attribute this trend to the "demographic waves" effect [24; 25] and to the postponement of births due to the 2015–2016 economic crisis [26]. To overcome the demographic crisis, additional measures of state support are needed, aimed at stimulating high-priority births [27]. The implementation of such a policy should be accompanied by further improvement of the health system, including measures to reduce infant and child mortality rates [21].

On the background of a decrease in the share of children among population, the picture that characterizes their physical well-being – health – is adverse. According to Russian studies, the health potential of children decreases as they grow older [28–32]. Considering these trends, more attention is paid to activities of institutions involved in preserving health of the younger generation: health, education, family, and social protection. Healthcare is a specialized institution in this list, creation of favorable infrastructure conditions for the prevention of violations of children's health, its restoration, and preservation depend on its activities. One of the priorities of such specialists is the solution of problems of preventive medicine: in particular, work with population to increase their commitment to a healthy lifestyle and organization of regular preventive checkups and medical examinations[2]. Among other priorities, experts mention health of adolescents, reduction of disabilities, improvement of medical rehabilitation, optimization of a system of medical and social care for children [33].

Improvement of the child health care and increase of its accessibility are priorities of the WHO Global Strategy for Women's, Children's and Adolescent's Health[3]. In the Russian state social policy, ensuring the availability of high-quality child health services is also a priority. This is shown in the federal project "Development of child health care, including the creation of a modern infrastructure for providing medical care to children" [4], in the National Strategy for Action on Children for 2012–2017[5], and in the action plan for 2018–2020 during the Decade of Childhood (2018–2027)[6].

[1] Population of the Russian Federation by gender and age as of January 1, 2019. Available at: https://rosstat.gov.ru/bgd/regl/b19_111/Main.htm

[2] On approval of the state program of the Russian Federation "Healthcare Development": Executive Order of the Government of the Russian Federation no. 1640, dated December 26, 2017. Available at: http://static.government.ru/media/files/hJJb4XgcAxhafiBW27EyseBZmtCra0RH.pdf

[3] *Global Strategy for Women's, Children's and Adolescent's Health*. World Health Organization, 2010. 24 p.

[4] Passport of the federal project "Development of child healthcare, including the creation of a modern infrastructure for providing medical care to children". *Official website of the Ministry of Health of the Russian Federation*. Available at: https://www.rosminzdrav.ru/poleznye-resursy/natsproektzdravoohranenie/detstvo

[5] On the national strategy for action on children for 2012–2017: Executive Order of the President of the Russian Federation no. 761, dated June 1, 2012. *Official website of the President of Russia*. Available at: http://kremlin.ru/acts/bank/35418

[6] On approval of the action plan for 2018–2020 during the Decade of Childhood: Executive Order of the Government of the Russian Federation no. 1375-p, dated July 6, 2018. Available at: http://government.ru/docs/33158/

Russian researchers have repeatedly discussed the best organization of the system of continuous monitoring and protection of children's health. Thus, specialists of the Research Center for Children's Health of the Russian Academy of Medical Sciences (A.A. Baranov et al., 2008) mentioned a necessity to develop a national classification of avoidable health losses among child population to determine priority goals and objectives in its protection. As an example, the researchers cite the European Classification of Preventable Deaths, based on three levels of prevention. The first level primarily covers factors of conditions and lifestyle of population, the second one – timely detection and early diagnosis of diseases, the third one – adequate treatment and organization of high-quality medical care for patients. The authors call disability an important indicator of health among child population, pointing out that the rehabilitation potential of a family plays a significant role in preventing its aggravation among sick children [34]. In later works, the idea of preventable health losses of child population was revealed in more detail [35]. As part of its approbation, measures to prevent risk factors for the development of mental disorders among children are proposed. This was based on the guidelines of the European Strategy for Child and Adolescent Health and Development (2005), one of which is ***all stages of the life cycle approach***. Its meaning is that "strategies and programs should be focused on solving problems related to child health at each development stage: from a prenatal period to adolescence, according to the most vulnerable age groups and risk factors associated with the economic situation in a region" [36].

The need for joint efforts of a family, education, and medicine in the preservation of child health throughout an entire growing up period was also pointed out by other domestic authors. Specialists of the Ministry of Health of the Republic of Tatarstan revealed a positive regional experience of the work of health centers for children in terms of increasing medical activity of families, improving interest in an independent healthcare of adolescents. The priority of expanding the interaction of specialists of these centers with educational organizations in the region to improve the effectiveness of preventive work was noted. An important result of this cooperation was the implementation of a special screening among schoolchildren. As a result, risk factors for the development of myopia were identified among 72% of students. Most of them were high school students with signs of Internet addiction (who spend a lot of time using social networks, playing videogames, and other entertainment) [37]. According to research data, the procedure for conducting preventive examinations of child population requires significant improvement. So, using a case-study of the Sverdlovsk Oblast, it was shown that a lack of narrowly focused specialists in first-level healthcare organizations leads to a noticeable decrease in the quality of preventive examinations. On the background of a high level of pathologies spread among child population, a number of medical recommendations, issued to children with identified health and physical development disorders, is insufficient. There is an inconsistency in the definition of the health group of schoolchildren and the group for physical education, as well as the problem of poor-quality informing of children's parents about examinations results. In some cases, parents themselves do not comply with issued medical prescriptions for their children's treatment [38].

A significant decrease in children's health occurs during the school period. Based on a nine-year clinical observation of health of 426 Moscow schoolchildren, the researchers proved a necessity for a number of health-preserving measures in educational organizations: improvement of the quality of children's nutrition in canteens, teaching children and their parents the rules of healthy

eating, annual in-depth examination of obese schoolchildren by an endocrinologist, dispensary observation by an allergist and otolaryngologist of schoolchildren with allergic respiratory diseases. Throughout all the years of studying in educational institutions, it is recommended to conduct therapeutic and correctional work with students who have disorders of the musculoskeletal system. In relation to children with neurotic and asthenic reactions, it is advisable to conduct psychological correction and optimization of educational and emotional load in 1–2nd, 7–8th, and, in particular, in 9th grades in preparation for GIA (State Final Examination) [39].

An overview of healthcare policy documents and the works of domestic specialists suggest that, despite a high interest of the government and society in ensuring the reproduction of healthy generations, the following problems are still relevant for Russia:

1) decrease in the share of children among population;

2) low child health potential;

3) insufficient coordination of activities in healthcare, education and family institutions for the protection and promotion of child health.

With this in mind, the *purpose* of this *study* was formulated: it is an analysis of child population's health status and assessment of individual institutional factors of its formation. The study period covered 2005–2019, which is substantiated by a need to study a current state of the problem and trends over the last 15 years (the period of popularization of the country's socio-demographic policy).

Research methodology

The study was based on quantitative and qualitative sociological and medical-sociological methods.

1) Sociological survey of families with children aged 3–17 years, conducted in 2018 in the Vologda Oblast among 1,500 families in Vologda and Cherepovets and 8 municipal districts of the Oblast. The sample is representative; the sampling error did not exceed 3% with a confidence interval of 4–5%. The survey used four types of questionnaires, depending on a child's age: for parents of preschool children (3–6 years), younger (7–10 years), middle (11–14 years), and senior school (15–17 years) ages.

2) Prospective monitoring of cohorts of families with children. Since 1995, the Vologda Research Center of RAS has been conducting a medical and sociological monitoring study "Studying the conditions for the formation of a healthy generation". The sample consists of families with children born during a certain period. The health of children is monitored until they reach the age of 18. The study involves large towns of the region (Vologda, Cherepovets), towns-district centers (Veliky Ustyug, Kirillov), and Vozhega – an urban-type settlement. During the period of longitudinal observation, five cohorts of families with children born in 1995, 1998, 2001 and 2004, 2014 were examined[7]. In 2020, a new cohort of participants was recruited.

3) Focus group studies of parents with children aged 3–17 years. In 2019, 5 focus groups were taken into account: 3 in Vologda, 1 in Cherepovets, and 1 in the Oblast's municipal region. 36 people were examined, different in age, presence and age of children, level of education, marital status. An idea of real problems of families with children in the region was obtained, the expectations of parents regarding their solutions (including children's health sphere) were revealed.

4) Expert survey of specialists of the regional healthcare system, representatives of the authorities responsible for the protection of children's health. In 2019, 10 expert interviews were conducted with

[7] For more information about the methodology of the longitudinal study "Studying the conditions for the formation of a healthy generation", see [10].

specialists whose activities include work with families and children. The experts outlined their vision of possible ways to increase the potential of children's health.

The rich empirical base of the study, collected through a combination of qualitative and quantitative methods, allows us to give a comprehensive assessment of a current situation in the field of children's health and healthcare, as well as to formulate directions for solving problems related to the preservation of child health, taking into account opinions of parents, medical professionals, and government representatives.

Research results

Child health status

Despite notable healthcare achievements in the Russian Federation, which have reduced infant mortality by 55%, from 11.0 cases per 1,000 live births in 2005 to 4.9 per 1,000 live births in 2019[8], it is too early to talk about improving child health in general. The primary morbidity rate of children aged 0–14 years increased by 2% over 13 years (from 1708.78 cases per 1000 children aged 0–14 years in 2005 to 1746.94 cases in 2018[9]). The incidence of adolescents increased by 22% (from 1114.52 cases in 2005 to 1360.20 cases in 2018[10]).

There were also significant changes in the structure of primary morbidity among children aged 0–14 years in 2005–2018. Unfavorable trends include a slight increase in the spread of eye diseases (by 2% – from 5,577 to 5,700), injuries and consequences of external influences (by 3% – from 10,352 to 10,618 cases per 100 thousand people), and a significant increase in the incidence of malignant neoplasms (by 38% – from 341 to 469 cases per 100 thousand people), obesity (by 47% – from 256 to 375), diabetes mellitus (by 65% – from 13 to 21)[11]. The number of children aged 0–14 years with malignant neoplasms has increased by 71% over 10 years (from 2008 to 2018), and the number of adolescents with such diagnoses has increased by 37% over the same period[12] [40].

A high level of morbidity among Russian child population in 2005–2018 was followed by an increase in its chronicity for certain classes of causes [41], as well as an increase in the detection of congenital pathologies [42]. In 2015–2018, the share of children aged 0–14 years with chronic diseases remained high and basically unchanged – nearly 15%. Among children under one year of age, this figure was slightly lower – about 8%[13].

Relevant issues of health among child population also include high child disability[14] [43]. During the specified period, absolute and relative disability indices among Russian child population increased by 1.2 times and 1.08 times, respectively. In 2019, these values were 670 thousand people and 222 people per 1000 children, respectively[15].

These problems are actualized by studies aimed at identifying factors that preserve health of child population and searching for its management tools.

[8] Infant mortality. *Official website of the Federal State Statistics Service*. Available at: https://rosstat.gov.ru/storage/mediabank/demo22.xls

[9] Morbidity of children aged 0–14 years by main classes and groups of diseases. Healthcare in Russia. *Official website of the Federal State Statistics Service*. Available at: https://rosstat.gov.ru/folder/210/document/13218

[10] Morbidity of children aged 15–17 years by main classes and groups of diseases. Healthcare in Russia. *Official website of the Federal State Statistics Service*. Available at: https://gks.ru/bgd/regl/b19_34/IssWWW.exe/Stg/02-56.doc

[11] Morbidity of children aged 0–14 years by main classes and groups of diseases. Healthcare in Russia. *Official website of the Federal State Statistics Service*. Available at: https://gks.ru/bgd/regl/b19_34/IssWWW.exe/Stg/02-45.doc

[12] Morbidity of children with malignant neoplasms. *Official website of the Federal State Statistics Service*. Available at: https://rosstat.gov.ru/storage/mediabank/3-8.xlsx

[13] Results of preventive examinations of children aged 0–14 years. *Official website of the Federal State Statistics Service*. Available at: https://gks.ru/bgd/regl/b19_34/IssWWW.exe/Stg/02-43.doc

[14] Distribution of a number of disabled children aged 0–17 years by diseases that caused the occurrence of disability. *Official website of the Federal State Statistics Service*. Available at: https://gks.ru/bgd/regl/b19_34/IssWWW.exe/Stg/02-67.doc

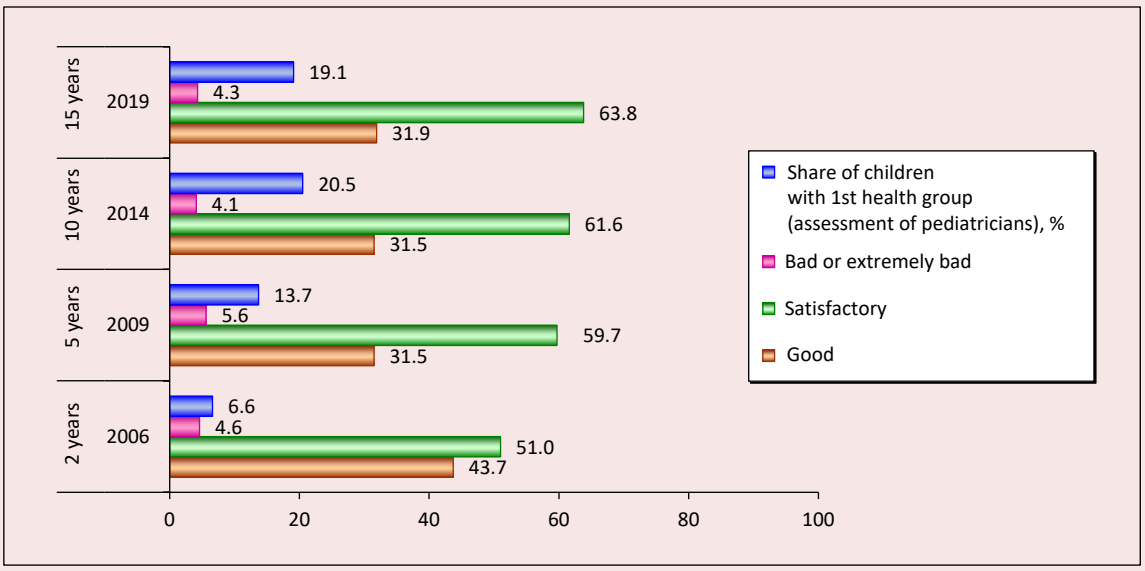
[15] Healthcare in Russia. *Official website of the Federal State Statistics Service*. Available at: https://rosstat.gov.ru/folder/210/document/13218

The solution of these problems can be practically used in the area of improving the coordination of the work of the institutes of health, education, and family in the field of protecting and promoting health of child population.

Data of the cohort monitoring allows not only tracking current health parameters of child population in the region (cross-sections of data), but also getting a picture of their changes over time for the same participants (longitudinal cross-sections of data). During this prospective observation, a number of patterns were identified that characterize health of the participants. In the development of children, critical ages are identified, which account for maximum "declines" of health. These are the periods of the first year of life, 6–7 years (entry into primary school), and 9–10 years (transition to secondary school, when the decline of health is determined by the increase in study load) [5]. At the previous stages of the study, the age-specific factors of children's health formation were shown. Thus, it was revealed that the combination of biomedical and social factors most significantly affects newborns [44]. Behavioral factors are beginning to play a significant role in shaping health of school-age children. In particular, the lack of formation of health-preserving skills among children has a negative impact. For example, according to responses of parents in 2019, 40% of 15-year-olds did not adhere to a correct sitting at the desk when writing and reading, 49% – to a work regime at a computer (they did not take necessary breaks for the prevention of visual impairment). At the same time, visual disturbances, involving the wearing of glasses or contact lenses, were detected among 32% of adolescents, but 13% of them did not use glasses, despite a doctor's recommendations.

Unfavorable factors in the formation of health of younger generation also include *the lack of awareness of parents about the health status of their children*. This is evidenced by the discrepancy between parental assessments of children's

Figure 1. Distribution of parental health assessments in the cohort of children born in 2004 (% of a number of respondents in a corresponding year) and the share of children with the first health group according to pediatricians' assessments (% of a number of children in the cohort)



Source: cohort monitoring data "Studying the conditions for the formation of a healthy generation", 2006–2019.

health and those made by pediatricians, observed throughout the study period. Thus, in 2019, 32% of parents of children born in 2004 described their child's health as "good", while, according to pediatricians, only 19% of children in this cohort were completely healthy *(Fig. 1)*. Among most children whose health was considered good by their parents, pediatricians noted either frequent infectious diseases during the year, or functional and morphofunctional disorders, which corresponds to the health group II. For children whose health was described as satisfactory by their parents, pediatricians' assessments were also divided: most of the children did have the health group II, while 20% had no health disorders, and another 20% had chronic diseases (which corresponds to the health group III). Only two children had parents who reported poor health (one child actually had chronic diseases).

Inconsistency of the health assessment by medical professionals and parents, revealed in the monitoring, is also confirmed by other data. Thus, according to the results of a sociological study of the health of schoolchildren in Vologda and Cherepovets[16], 43% of families rated health of their children as very good, while in fact (according to school medical offices) the share of completely healthy children was only 11.5%. The health assessments of 11th grade students differed the most: 35% of parents considered their children's health as very good, and only 1% of them actually were like this according to medical records. The most common diseases among schoolchildren at the end of high school (grade 11) were diseases of the musculoskeletal system (60% of children), cardiovascular system (37%), visual organs (34%), nervous system (33%), respiratory system (15%), and digestive system (14% of children).

The reasons for the discrepancy between parental and medical assessments of the current state of children's health are the lack of appropriate competencies and lack of awareness among parents. On the other hand, when assessing child health, parents look at whether it allows him to socialize normally. If there are no complaints from a child and serious functioning limitations, then health is assessed as "good". Based on available information, understanding the degree of its importance, awareness of the responsibility of a family for preserving children's health, appropriate behavioral practices of health conservation are formed. It can be assumed that inaccurate information of parents and incorrect behaviors can be among possible reasons for the chronization of untreated diseases among children as they grow up. Medical professionals are more accurate in their assessments, as they are guided by the presence or absence of diseases and developmental disorders, so it is very important to establish information interaction between medical professionals and families using modern capabilities and information transmission channels.

According to the monitoring data, the majority of parents of 15-year-olds (72%) considered themselves sufficiently informed about their child's health. The main sources of information for the respondents were conversations with a child's attending physician and nurse (this option was selected by 87 and 21% of respondents, respectively), as well as the mass media (26%; *Tab. 1*).

Full awareness of parents, being the most important prerequisite for an objective assessment of health, is not yet a sufficient condition for its preservation and strengthening. Medical activity

[16] The research was conducted together with the Health Department of the Vologda Oblast. It included a sociological survey based on a formalized questionnaire of parents and students, interviews of the administration, teachers of educational organizations, and analysis of medical records at schools. Sample of the study – 1103 students from forms 1, 2, 5, 9, 11 of 10 general education organizations (641 people from forms 1–5, 462 people from forms 9–11), 1185 parents, 50 pedagogical workers.

Table 1. Distribution of parents' responses to the question "What is your primary source for receiving information about health and organization of care for your child?" (2019, case study of a cohort of families with children born in 2004)

Response	Share of respondents who chose this response option, %
Doctor	87.2
Television, radio, Internet	25.5
Nurse	21.3
Literature	6.4
Child's medical record	6.4
Relatives, friends, acquaintances	6.4
Other	2.1
Source: cohort monitoring data "Studying the conditions for the formation of a healthy generation", 2019.	

of a family and disciplined adherence to doctor's recommendations play a major role in this regard. A common mistake of parents is a refusal to timely consult a doctor in case of a child's acute illness. According to the cohort monitoring, in 2019, nearly 23% of teenagers' parents did so. Another problem is a failure to fulfill prescriptions of a treating doctor. In 2019, 15% of teenagers' parents revealed that they do not always strictly obey doctor's recommendations and follow a prescribed course for treatment or improvement of a child.

Considering the aforementioned health problems of the younger generation, it is particularly important to strengthen information and educational work with parents in the system of medical prevention. At the same time, the issues of quality and accessibility of health services for families with children come to the fore.

Issues and factors of the child health formation

When discussing medical activity of families, it is important to consider the aspects of the availability of medical care, convenience of receiving it, which mostly limit receipt of high-quality and timely medical care. Based on the results of a sociological survey of families with children in the Vologda Oblast conducted in 2018, it was revealed that, when applying for medical care in state institutions, parents with children most often noted the presence of such problems as the lack of necessary specialists (30% of respondents), queues (30%), and an inconvenient schedule for specialists' appointments (24%).

The lack of qualified medical personnel, especially narrowly focused specialists, is noticeable across the whole country, which is confirmed by medical statistics. In Russia, the number of child pediatricians decreases and the ratio of part-time work in this specialty increases [45].

In several regions of the Northwestern Federal District in 2005–2018, there was a decrease in the number of registered pediatricians[17]. As of 2018, in the federal district as a whole, there were 9.75

[17] *Main Indicators of Maternal and Child Health, Activities of the Child Protection and Maternity Services in the Russian Federation: Stat. Coll.* Department of Health Monitoring, Analysis, and Strategic Development of the Ministry of Health of the Russian Federation, FSBI "Federal Research Institute for Health Organization and Informatics of the Ministry of Health of the Russian Federation" of the Ministry of Health of the Russian Federation. Moscow, 2012. 191 p.; *Resources and Activities of Healthcare Organizations. Medical Personnel Part: Stat. Coll.* Department of Health Monitoring, Analysis, and Strategic Development of the Ministry of Health of the Russian Federation, FSBI "Federal Research Institute for Health Organization and Informatics of the Ministry of Health of the Russian Federation" of the Ministry of Health of the Russian Federation. Moscow, 2018. 278 p.; *Resources and Activities of Healthcare Organizations. Medical Personnel Part: Stat. Coll.* Department of Health Monitoring, Analysis, and Strategic Development of the Ministry of Health of the Russian Federation, FSBI "Federal Research Institute for Health Organization and Informatics of the Ministry of Health of the Russian Federation" of the Ministry of Health of the Russian Federation. Moscow, 2019. 281 p.

Table 2. Availability of doctors of various specialties, per 10,000 children, the Vologda Oblast

Specialty	2017	2018	For reference: standard for polyclinics per 10,000 children (2018)
Pediatric cardiologist	0.40	0.44	0.5
Pediatric oncologist	0.04	0.04	0.1
Precinct pediatrician	8.33	8.17	12.5
Pediatric psychiatrist	0.37	0.42	–
Adolescent psychiatrist	0.00	0.00	–
Pediatric dentist	0.84	0.84	–
Urologist-andrologist for children	0.04	0.04	1
Pediatric surgeon	0.88	0.84	1
Pediatric endocrinologist	0.40	0.40	0.5

Source: *Resources and activities of healthcare organizations. Medical Employees: Stat. Coll.* Department of Health Monitoring, Analysis, and Strategic Development of the Ministry of Health of the Russian Federation, Federal Research Institute for Health Organization and Informatics of Ministry of Health of the Russian Federation. Ministry of Health of the Russian Federation. Moscow, 2019. 281 p.; On approval of the regulations on the organization of primary health care for children: Order of the Ministry of Health of the Russian Federation no. 92n, dated March 7, 2018. Available at: https://www.garant.ru/products/ipo/prime/doc/71825984/

district pediatricians per 10,000 children, while in the Vologda Region – 8. To compare, in accordance with the order of the Ministry of Health, which was in effect in 2018, a recommended staff standard for providing child polyclinics with precinct pediatricians was 12.5 units per 10,000 attached children[18]. Therefore, it is possible to talk about the shortage of such doctors in the region and the district. Among medical specialists, the best provision of child population in the Vologda Oblast is with surgeons and dentists, the worst – with adolescent psychiatrists (who are absent in the region), pediatric oncologists, and urologists-andrologists *(Tab. 2)*.

All parents are concerned with the lack of medical personnel and queues, while worries about inability to get an appointment at the right time, lack of free medicines, and poor organization of registration offices is more pronounced among parents of preschool children (27, 23, and 13%, respectively).

Issues related to the quality of medical staff are less relevant. 6.5% of parents of preschool children, 5.4% of parents of primary school children and 8% of parents of middle and high school age children reported systematic disrespect in medical institutions. The problem of tardiness and irregular breaks in the work of medical staff was most often mentioned by parents of children aged 11–14 years (9.2%; *Tab. 3*).

In case of private medical organizations, the listed problems barely bothered parents. However, an in-depth study, conducted earlier, revealed a contradiction: despite existing problems of state medical institutions, according to parents, efficiency of services is higher in these places. Moreover, most services are free, and it is very important for families with children [46].

The results of the mass survey were confirmed during *a focus group study*. Among the key medical care problems for families with children, parents most often mentioned *the lack of narrowly focused specialists* in children's clinics, *inability to make an appointment* and *individual procedures* (for example, ultrasound). The discussion also raised the issue of *a low availability of free medical services*

[18] On approval of the Provision on organizing primary medical help for children: Executive Order of the Ministry of Health of the Russian Federation no.92n, dated March 7, 2018. Available at: https://www.garant.ru/products/ipo/prime/doc/71825984/

Table 3. Issues that arise in families with children when seeking medical care (according to a sociological survey, 2018)*

Issues	Share of respondents who reported a persistent nature of the issue, %			
	Parents of 3–6 years old children	Parents of 7–10 years old schoolchildren	Parents of 11–14 years old schoolchildren	Parents of 15–17 years old schoolchildren
Lack of necessary specialists	**30.8**	**27.4**	**30.7**	**30.0**
Queues	**31.2**	**29.6**	**29.1**	**30.5**
Inconvenient schedule for specialists' appointments	**27.3**	**20.1**	**25.9**	**23.7**
Lack of free medicines	22.7	19.3	21.5	20.7
Poor organization of registry offices	12.6	8.2	8.4	10.8
Tardiness, irregular breaks in the work of medical staff	7.9	6.2	9.2	7.4
The need to pay for medical services that should be free	18.2	13.1	18.5	18.2
Lack of information about work of specialists and who you can contact in case of certain diseases	14.8	12.6	14.7	14.9
Inattentive attitude of medical workers	12.7	10.3	13.9	11.7
Rudeness, disrespectful attitude of medical workers to patient	6.5	5.4	8.9	8.3

* Distribution of respondents' answers to the question "What problems, related to your child's health care, do you face in public healthcare institutions?"
Source: results of a mass survey of parents of children aged 3–17, 2018.

– Lack of specialists. They are impossible to find. First, an epidemic occurs: you do not go to a clinic, because you do not want to infect a child. Then doctors themselves are on sick leave or on vacation (fem., Vologda, 36, married, 1 child, higher ed., employed).

– It is problematic to make an appointment for ultrasound even three months in advance. It happens sometimes. Maybe the clinic is quarantined, which is why schedule shifts. Parents also have an option – to go to a private clinic, but money is sometimes an issue. We once took the child to a hematologist, and he says: "Why did you come for payment? You could sign up in three days". And we had to register him for rehabilitation, some comments were given about his blood test. Until the specialist approves... So I had to go for a fee (male., Vologda, 49, married, 3 children, higher ed., retired).

– There is a shortage of specialists here and in Vologda. When do they have checkups? In spring? Coupons are given, then it is all lost by fall, in summer you cannot get to a specialist at all, only for a fee. But for a fee, you know, not everyone can… I have a surdologist assigned to my child. We have 2 surdologists: both are paid ones. (fem., Cherepovets, 43, not married, 2 children, higher ed., employed).

– We need to visit an allergist. There is only one allergist in the town. I do not know how to get to him?! "Go to him for a paid appointment for 700 rubles". I have three children. I have to pay 2100 for three of them, and then what? (fem., Vologda, 32, married, 3 children, higher ed., employed).

– The orthopedist works every other day. When he does not work, he is in another clinic. Well, it happens all the time... you go to a paid appointment – you snatch money from the family. While there is free medicine (male., Vologda, 39, married, 2 children, higher ed., employed).

– I have a situation. The child is 8 years old. We were sent to a surgeon, because of an umbilical hernia. There was no specialist in the clinic, I came to the clinic three times before 8 am. When there was the specialist, there were no coupons. I thought that it was not so terrible – an umbilical hernia, so we just did not go to either paid or free doctor (fem., Cherepovets, 32, not married, 3 children, higher ed., employed).

*– For children, we would like medical services to be "more free". This is our society. Medicines are very expensive. Even in villages: if someone had a serious disease, others donated (*for reference – to cure a child*). After all, this problem can be solved by the government* (male, municipality, 46, non-official marriage, 3 children, full secondary education).

– The nurse is always absent (for reference – in the kindergarten). *She currently comes and leaves... When it is necessary, they come – like for vaccinations ... In Soviet times, a nurse went around and checked health of children. If someone had signs* (for reference – *of diseases), then they were withdrawn. And now no one does this, children are brought, and that is all. A teacher cannot examine 30 people. A teacher is not a doctor. Maybe a child had a lack of sleep. A disease may be invisible. A teacher and a parent may miss some signs. I speak of my child's experience. I can tell the difference only when he has a 40-degree temperature. There is no medical worker, so there is no one to check the group* (fem., Vologda, 39, married, 1 child, higher ed., employed).

– The government does not organize the control of admission to kindergartens. A doctor must meet a child when he/she is brought there. But now, until evening, a child with fever sits in the group and does not play. I went through this: they called, I came back in an hour. The child had a fever, and we took a sick leave. We recently had a medical examination and passed only tests, and, for some specialists, we have a problem with vision for example, you get registered, receive a referral, and confirm whether the child can sit at this desk. There are professional checkups of children, but they are superficial. (fem., Vologda, 27, not married, 1 child, sec. sp. ed., employed).

– In the kindergarten, there is a medical worker with a medical education. But in some places kids are examined, and in another – they are not. And they are looking at it while it is happening (for reference. – a disease of a children)*: 2–3 weeks. They begin the examination, and then everything is fine.* (male, Cherepovets, 40, unofficial marriage, 2 children, sec.sp.ed., employed).

– One medic for a large kindergarten, 12 groups of 25 people, he is physically unable to examine all of them. (fem., Vologda, 36, married, 1 child, higher ed., employed).

to parents' unwillingness to initiate the prevention of children's health disorders, their low medical activity and lack of competence in healthcare issues. This attitude may be a consequence of the fact that, with a lack of their own resources, parents expect support from the government. The objective factor limiting parents' capability to preserve children's health is a bad financial situation. Its improvement is a fundamental task of regional economic policy; its solution will reduce the severity of social problems of medicines provision and access of families with children to paid medical services by increasing efficient demand. The appeal to paid medicine keeps the relevance of the potential development of the state health system: it is technically free for population, but, in fact, it is partially funded by the Compulsory Medical Insurance Fund – parents also contribute to it.

Some parents consider social government support a necessary condition for raising their children. Other people strive for taking an independent position: they say that if they had a decent job that would have allowed them to maintain a high standard of living, financial assistance from the government, benefits, allowances, and free medical services would not be critically important for them, since they could purchase all the necessary benefits themselves. Their only expectation from the government in this area would be the construction and maintenance of child infrastructure (sports fields, bike paths, stadiums, etc.).

In general, conducted sociological studies allow identifying three most relevant issues in the area of child health protection: insufficient awareness of parents and teachers about an actual state of children's health, the increase in the number of children with chronic diseases during school education, and the lack of a coordinated work system in educational organizations and among the parent community.

As for my family, I need nothing from the government. If only they would build bike paths. Infrastructure. If they had provided parents with an opportunity to work and earn money. I would do everything myself. Buy the books and everything else... Let me earn money, and that would be it! It is not necessary to introduce benefits for large families – it seems a humiliation! Give a man a job, so his wife could take care of three children, and they both could avoid unnecessary headaches caused by questions like "what to eat and wear, how to solve household issues and move into a bigger apartment". If he can find a job, then he can buy everything himself (male, Vologda, 30–39, married, 2 children, higher ed., employed).

Experts' evaluations usually coincide with findings of mass surveys and focus groups. Experts unanimously classified the problem of ***reduced potential of children's health in the growing up process*** as strategically important. According to data provided during the interview on the results of professional checkups and medical examinations of child population, the number of children with chronic diseases increases every year. Individually, physical, mental, and reproductive health of children deteriorates with age. Experts say that one of the main factors of these problems is ***the lack of information on child health issues among parents,*** and their ***incompetence in cultivating health-preserving skills among children***. Moreover, experts confirmed that, as a child grows up, parents become less concerned about his/her health. Maximum attention is paid to children's health in infancy, preschool and primary school age: it is when parents have an interest and time, and medical workers constantly supervise a child. In addition, during this period, the interaction of parents with medical specialists is closely established (through the work of foster nurses, district pediatricians). Besides, parents establish a close interaction with medical specialists in this period (through the work of foster nurses and district pediatricians).

The interaction between parents, children, and medical workers starts to gradually weaken in a middle school. Insufficient medical activity of parents intersects with one of the key healthcare personnel issues – ***the lack of permanently employed medical workers in educational organizations***. Each educational organization has an attached medical worker, who frequently organizes examinations and vaccinations of children. However, according to experts, the problem is the absence of these specialists among an organization's staff. The reasons are uncertain. A primary explanation is an unfavorable position of medical workers under the jurisdiction of the education system, compared to those who work in the healthcare sphere – it is about the qualification and financial losses. Medical workers were removed from kindergartens and schools, because they had lower wages and benefits in case of being among an educational organization's staff. In addition, a general shortage of medical personnel contributes to the solution of the issue.

Experts have various explanations for ***the lack of narrowly focused specialists in child medical institutions***: some think that the problem is being solved, and others still regard it as the most relevant and unresolved issue. The current mechanism for training medical students in targeted areas is being approved. It allows returning qualified specialists to the region despite the absence of a medical university in the Vologda Oblast. Experts believe that the reasons for the current personnel shortage are the demographic crisis of the 1990s, which led to a numerical reduction of applicants to medical

universities and, as a result, future specialists. There also was the discretization of the medical profession that led to a massive outflow of employees from the healthcare sector.

The health problems, the perception of which is radically different in the parent and medical community, were the issues of ***a low availability of free medical services, a high cost of medicines, and quality of professional examinations among children***. Parents criticized educational organizations and the healthcare system, and the experts, on the contrary, pointed out the lack of competence among parents in the prevention of children's morbidity.

Experts emphasize that ***medical examinations of children*** are screening checkups aimed at timely detection of any violations or pathologies, and therefore they are fast. If deviations from the norm are detected, parents are informed of the need for more detailed consultation with required specialists and treatment. Thus, the problem is that ***parents barely understand the content and purpose of a professional examination*** and partially transfer their responsibilities to maintain children's health to medical professionals. Data confirms this statement: at the end of 2018, reproductive pathologies and abnormalities were identified among more than 4,000 children during professional examinations of girls aged 0–18 years. Only 1,000 of them were registered and received treatment. The purpose of preventive examinations is to identify a violation, contact a family, undergo a treatment, and bring a child to the "healthy" group. Failure to comply with this algorithm subsequently leads to an aggravation of health. The most common reason for the violation of this "ideal formula", according to experts, is that ***medical professionals and schools fail to adequately inform parents about the results of professional examinations due to the lack of time and personnel***. Parents, in turn, often "blindly" trust doctors and believe that examinations lead to improvement or preservation of health. Thus, they do not take any actions and, unwillingly, become the culprits of the formation of children's chronic pathologies.

Experts' opinions on a ***poor availability of free medical services and high costs of medicines*** were somewhat divided. Some of them call ***the underfunding of insurance medicine*** and, as a result, ***an inadequate system of tariffs, namely their over reduced sizes***, the main reasons for this situation. Other experts believe that it is incorrect to talk about unavailability of medicines, since there is a supply, and it is conducted for federal and regional categories of aided people. Specialists recognize that certain medicines may not be included in this list, but if a patient needs them, applications are made at requests. Considering unavailability of free medical services, some experts skeptically noted that the provision of assistance is regulated by a list of state guarantees, but if a certain procedure is still not available for a patient, the problem is solved by, for example, concluding contracts with third-party organizations. Meanwhile, they point out that currently functioning recording methods, including remote ones, effectively solve the problem of difficulties in making appointments with specialists.

Discussion of the results

Preservation and promotion of children's health implies a well-coordinated and purposeful work of family, health, and education institutions. Each one experienced significant transformations that had an impact, sometimes negative, on younger generations' health during the post-Soviet period. Currently, the main task is to coordinate activities of these institutions, focusing on priorities – well-being of child population, creation of conditions for the best development and implementation of its human potential.

Obviously, within the state social policy, there are attempts to ensure a proper functioning of healthcare and education spheres, and to improve social and financial situation of families with children, but so far it has been insufficient. Construction of perinatal centers, implementation of an active policy in the area of developing resource potential of healthcare, especially in pregnancy and childbirth fields, monitoring and medical services for children in the first year of life have made it possible to achieve significant success in reducing infant and maternal mortality, detecting hereditary diseases and congenital developmental pathologies. These achievements serve as motivation for further steps toward improving children's healthcare. The issues of improving the health of newborns remain on the agenda. To solve them, it is important to conduct competent and more active work with population of reproductive age. As one of the areas of such activity, we can suggest expanding the practice of preparing future parents for child conception and pregnancy by, for example, sending them to family, health, and reproduction centers (or other similar organizations), where future parents could undergo a comprehensive health examination, receive advice from medical specialists, and psychological support.

The solution of personnel issues in the regional healthcare system is among the priority tasks of the Vologda Oblast. According to the regional target program "Development of healthcare in the Vologda Oblast for 2021–2025", it is planned to allocate 1 398 555.8 thousand rubles for the development of the personnel potential of the industry[19]. Unfortunately, among the indicators of the state program, there is no indicator of the provision of children with pediatricians and specialists. Given the observed shortage of these doctors in the region, it is necessary to monitor these indicators.

Development of human resources and issues of ensuring a regular presence of a medical worker in an educational organization are the most important prerequisites for building a successful regional healthcare system for children. Within the framework of federal and regional programs for developing the industry, tools and financial support are provided for the training of specialists in the child health area. For medical personnel employed in educational organizations, there are currently no such management resources. Experts see specific solution to this problem *in maintaining all the privileges for the medical staff of kindergartens and schools in terms of remuneration, pension savings, and benefits*, provided that *the conditions for licensing medical offices are simplified and they are assigned to the healthcare system* to preserve medical experience and salaries, in accordance with the roadmap for paying medical workers. Alternatively, it is possible *to focus on the experience of licensing a medical office in universities* that use it on the rights of *operational management*, i.e. the office is in federal ownership, and an university is engaged in its maintenance (repair, purchase of equipment). On a contractual basis, medical employees work among the staff of a medical organization, and, as a result, all benefits are preserved for them.

Meanwhile, the presence of medical workers in educational institutions and a regular entrance monitoring of children's health do not yet serve as an absolute guarantee of health safety during pedagogical and educational process. A counter-effort from parents and teachers is also required. In particular, it seems appropriate to conduct explanatory conversations with parents about not bringing children with symptoms of an infectious

[19] *Website of state programs of the Vologda Oblast*. Available at: https://programs.gov35.ru/

disease to a kindergarten group and not sending them to school. Undoubtedly, in reality, parents often find themselves in a difficult situation when they do not receive understanding of an employer. Therefore, they are forced to choose between caring for a sick child and performing official duties. The inclusion of additional guarantees for working parents with young children in the Labor Code can prevent the occurrence of such dilemmas. For example, expansion of an opportunity for parents of young children to have a flexible work schedule or remote employment format (if nature of work allows it), at least for the period of a child's illness. Such forms of work are very popular, especially among single parents who cannot rely on help of family members in caring for children.

We should not forget about the organization of the health-saving environment within an educational organization. As previously mentioned, significant losses of child health occur during their schooling. It is the school educational process that places increased demands on the endurance of a child's body, its ability to resist stress and adapt to changing social conditions. Teachers need to provide all possible support to children, combining their efforts within a team, as well as involving parents and school healthcare workers. The solution of this problem requires not only the development of school health-saving programs, but also the introduction of a specialist (for example, a head teacher of health-saving) responsible for the quality and effectiveness of health-saving activities and its organization. Priorities of the school healthcare system should include improvement of notification of parents about the results of professional examinations, increase of interest among parents to not only obtain this information, but also to conduct, if necessary, additional examinations and follow recommendations of medical professionals, instilling health-saving skills in a family.

To develop inter-institutional cooperation in the field of healthcare, it is important to regularly exchange information, and its forms can be diverse – from thematic meetings and "round tables" to special NPOs projects on children's health issues involving parents, medical and educational organizations, social protection agencies, representatives of public organizations, and the scientific community.

Conclusion

The study, conducted using comprehensive methodological tools, revealed several personnel, organizational, and material issues in the field of preserving and strengthening child population's health. The key one is the problem of weak interaction between families, education, and healthcare. Each institute is simultaneously an object of state social policy, which makes it possible to adjust their current state and conditions of functioning. Thus, the focus group study showed the importance of an integrated approach to solving the problems of access to quality medical services for families with children. The authors proved that the improvement of the financial situation of families is no less important for the preservation of children's health than the development of infrastructure and human resources of the state health system. It is shown that opinions of parent and specialists, engaged in healthcare, significantly differ on a number of aspects. This actualizes the work on building a dialogue between them. The role of educational organizations in the system of preserving and promoting children's health can be called "coordinating", since they represent a primary environment for the socialization of children aged 3–18 years.

In general, the coherence of the identified problems led to the development and justification of a list of actions to overcome them that takes into account different aspects of child health and integrates efforts of several social institutions (family,

healthcare, education). The practical significance of proposed actions is an opportunity to implement them with minimal costs by integration into existing work algorithms of healthcare and education specialists. They can also be a basis for development and implementation of new management tools for preserving the health potential among children. In the future, it is planned to study the reasons for a weak interaction of institutions, involved in the preservation of child health, more deeply.

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Modeling the Interrelation between Formation Factors of Labor Demand and Its Supply*

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Abstract. The remaining problem of the imbalance on the Russian labor market determines the relevance of studying labor demand and its supply. For this purpose, the objective of identifying the interrelation between the factors of demand and supply formation on the labor market, described using two sets (vectors) of indicators, was set and achieved. The study model also includes labor migration, informal employment, and labor activity of elderly population as factors of labor supply, which ensure that the labor shortage is filled, and the labor market is balanced. The statistical base of the study is 2006–2018 Rosstat data for Russian regions. The results of the study showed that, since 2014, there has been a growing trend in the interconnection between the factors of labor demand and its supply. In difficult macroeconomic conditions, the Russian labor market adapts not by freeing up the labor force, but by expanding labor relation practices (including underemployment of population) while maintaining a low unemployment.

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Economic decline has led to a reduction in the need for labor, which, on the background of a narrowing supply of labor resources caused by population ageing, has strengthened the balance between supply and demand on the labor market. The growth of partial and part-time employment has become a key process in reconciling the demand for labor and its supply. The inclusion of all factors, studied in this research, in the model allowed us to assess their impact on the balance of labor demand and supply. Employment of population aged 60–72 years was the most significant factor among all supply and demand indicators on the labor market, which indicates a high potential of ensuring their balance.

Key words: labor market, demand, supply, labor force, employment of population, employment of elderly population, labor shortage, underemployment.

Introduction

There is a persisting problem of an imbalance of the demand for labor and its supply in the Russian economy: it is manifested in quantitative and qualitative imbalances on the labor market [1; 2]. On the one hand, there are unclaimed workers with certain qualifications and knowledge on the labor market; on the other hand, there is a shortage of workers in specific professions and specialties. It limits the growth of labor productivity and, ultimately, hinders economic development [3]. Since 2007, the share of the working-age population has been declining annually, and it had fallen from 63.0% to 55.9% by 2019. Even considering increased retirement age, according to the Rosstat forecast[1], it will not exceed the level of 2007 (60.1–62.5%, depending on the forecast version) by 2035. Population's ageing in the future will exacerbate the unbalance problem on the Russian labor market [4; 5]. According to A.G. Korovkin [2], there might be a shortage of labor even at low rates of economic growth, when the aggregate demand for labor stagnates.

The lack of balance between the demand for labor and its supply leads to big economic losses, so it is important to look for new and improve existing tools to realize the potential of using the main production factor – labor. It is believed that implementation of active longevity strategy is an efficient tool for solving current and future problems associated with population's aging [6; 7]. According to studies [8], a certain share of older age cohorts retains their resource potential in Russia – health, a high level of education, and significant intelligence. Moreover, the labor activity of pensioners is not a new phenomenon for Russia. However, many experts are concerned that older workers may face problems when looking for a new job and maintaining their current workplace [9]. The analysis of age discrimination [10] showed that the chances of employment for a person at the age of 29 are 1.8–2.5 times higher than at the age of 48. Accordingly, the change of working capacity limits in Russia poses new challenges for the labor market, related to this labor force and its need on the labor market [11]. The study of the interaction of factors of the demand formation for labor and its supply will allow us to assess possible further trends on the labor market, which is especially important when the ageing of population becomes a significant constraint in the formation of employment.

Approach

Due to a weak, for objective reasons, statistical security of the studied issue at the macroeconomic level [12], researchers face the problem of assessing and formalizing the concepts of labor demand and supply. As a rule, a number of employees

[1] *Estimated Population of the Russian Federation until 2035: Stat. Bull.* Moscow, Rosstat, 2020. Available at: https://gks.ru/compendium/document/13285 (accessed: December 1, 2020).

and vacancies are used for the analysis of labor demand, and size of the labor force and a number of unemployed – for the supply of labor. Discrepancy between labor demand and labor supply is estimated by comparing the values of these indicators [13; 14; 15]. This approach is included in A. G. Korovkin's model of coordinating labor demand and its supply [16]. This model describes the interaction between a number of potential employees (difference between working-age population and those employed in the economy) and vacant jobs. It takes into account demographic processes, factor of movement of employees and jobs. Such approaches are widely used in assessing the balance of labor supply and demand, but they have a disadvantage associated with the statistical accounting methodology. Thus, shortcomings of the use of capital and labor, inefficiency of the labor market functioning lead to a deviation of the real employment indicator from the demand for labor[2]. In addition, depending on the data source, there may be quite serious discrepancies in the estimate of a number of employees [15]. The declared need for employees in the form of vacancies, as V. E. Gimpelson notes [17], is far from being identical with the efficient demand for labor and the creation of jobs. Considering the aforementioned, we propose an original solution to the formalization of the concepts of labor demand and supply. The demand for labor and its supply are described using two sets (vectors) of indicators – factors of demand and supply formation on the labor market.

In the scientific literature, the question of a set of factors that form the demand for labor and its supply is not debatable. The textbooks[3] highlight such macroeconomic factors of labor demand as the level of economic development, investment activity, state of production factors, and the unemployment level. The supply, according to the theory of labor economics, reflects the willingness of workers to sell their labor for a certain reward, so it depends on the availability of labor and the level of its education and qualifications[4] [18]. In various scientific studies, this list of supply and demand factors is similar, but, depending on the scientific goals, it is supplemented considering the specifics or features of the labor market segment. Thus, for a complete and adequate assessment of the employment dynamics and the labor market, presented by scientists from the Institute of Economic Forecasting of RAS and the Moscow School of Economics at the Lomonosov Moscow State University[5], a total demand of the economy for labor is determined by the volume of production and investment, and a total supply – by demographic trends and the labor potential quality. In the analysis of the relationship between supply and demand on the labor market considering the gender structure of the labor force, I. B. Korolev [19] additionally identified such factors as the size of the public sector and the service sector. In studying the process of coordinating supply and demand taking into account educational features of the labor force [20], a set of factors that affect demand was significantly expanded (the level of technologies used, parameters of state policy in the field of education, availability of education, etc.; *Fig. 1*).

During a decline in working-age population, the problem of determining alternative sources of labor resources, as well as opportunities to make up for numerical labor losses, is important [21]. Therefore, for the purpose of our study, labor migration, informal employment, and labor activity of elderly population are also considered labor supply factors. These factors characterize a satisfied need (demand) for labor; each of these employment types

[2] *Applied Forecasting of the National Economy: Textbook*. Ed. by Ivanter V.V., Budanov I.A., Korovkin A.G., Sutyagin V. S. Moscow: Ekonomist, 2007. 896 p.

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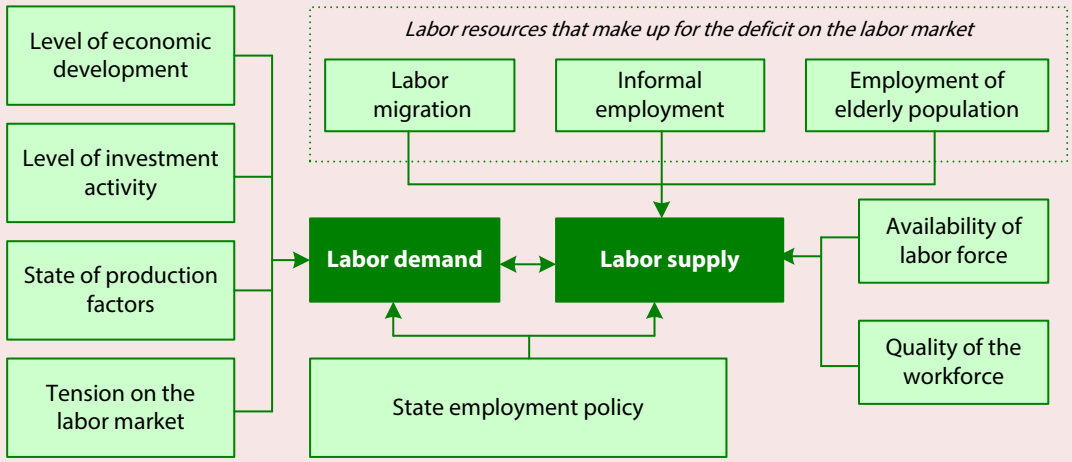
Figure 1. Factors of the formation of demand for labor and its supply



Source: own compilation.

occupies a specific segment, a "niche" on the labor market [22–26]. At the same time, they ensure replenishment of the deficit and the balance on the labor market, which characterizes the potential supply of labor. The inclusion of these factors in the model will allow assessing their impact on the balance between labor demand and its supply.

Research data

The statistical basis of the study is Rosstat data for 2006–2018 for the regions of Russia, including the results of sample surveys of the labor force. The corresponding indicators are selected for the chosen factors of the formation of labor demand and its supply *(Tab. 1)*.

Table 1. Indicators of supply and demand factors on the labor market

Indicator designation	Indicator, measurement unit
Indicators of demand factors	
X_1	Degree of depreciation of fixed assets for the full range of organizations, %
X_2	Indices of the physical volume of investments in fixed capital, in comparable prices, as a percentage of the previous year
X_3	Unemployment rate of population aged 15–72 years, %
X_4	Labor productivity index, as a percentage of the previous year
X_5	Index of the physical volume of the gross regional product, in constant prices, as a percentage of the previous year
X_6	Labor market tension coefficient, units
Indicators of supply factors	
Y_1	Employed in the informal sector, as a percentage of a total employed population*
Y_2	Labor force participation rate of population aged 15–72, %**
Y_3	Population with higher and secondary vocational education, as a percentage of the workforce**
Y_4	Number of employed people entering work, as a percentage of a number of employed people in a corresponding region
Y_5	Employment of population aged 60–72 years, %

* The indicator partially describes informal employment.
** Considering changes in the terminology of statistical accounting of Rosstat.
Source: own compilation.

The model does not include regions that do not have statistical data on the selected indicators, as well as regions with indicator values that deviate more than twice from the average value for a year. As a result, a sample of 68 entities of the Russian Federation was obtained.

Model

The employment level of population aged 60–72 years is one of the indicators of supply factors on the labor market. However, the labor market is a relationship between two sets (vectors) of indicators – supply and demand. There is no output variable here, so it is difficult to use regression analysis. In this case, one of the tools can be the coefficient of closeness of interdependence between random vectors, earlier introduced in the study [27]. For a particular case, when vectors $\mathbf{X} = (X_1, \dots, X_m)$ and $\mathbf{Y} = (Y_1, \dots, Y_l)$ have joint normal distributions, the coefficient of closeness of the interdependence between random vectors **X** and **Y** is determined by the formula:

$$D_e(\mathbf{X}, \mathbf{Y}) = 1 - \frac{|\mathbf{R}_{\mathbf{X}\cup\mathbf{Y}}|}{|\mathbf{R}_{\mathbf{X}}| \cdot |\mathbf{R}_{\mathbf{Y}}|} \quad (1)$$

where: $|\mathbf{R}_{\mathbf{X}}|$, $|\mathbf{R}_{\mathbf{Y}}|$, $|\mathbf{R}_{\mathbf{X}\cup\mathbf{Y}}|$ are determinants of correlation matrices of random vectors X, Y, $\mathbf{Z} = \mathbf{X} \cup \mathbf{Y} = (X_1, \dots, X_m, Y_1, \dots, Y_l)$, $0 \le D_e(\mathbf{X}, \mathbf{Y}) \le 1$.

The higher the coefficient value $D_e(\boldsymbol{X}, \boldsymbol{Y})$, tighter the relationship between the random vectors X and Y is. Value $D_e(\boldsymbol{X}, \boldsymbol{Y}) = 1$ indicates the presence of a linear functional relationship between, at least, two components of the vectors X and Y. If $D_e(\boldsymbol{X}, \boldsymbol{Y}) = 0$, then random vectors X and Y are linearly independent.

In this case, we have vectors of indicators of demand $\mathbf{X} = (X_1, \dots, X_6)$ and supply $\mathbf{Y} = (Y_1, \dots, Y_5)$ factors. The analysis showed that they can be described by multidimensional normal distribution laws.

Along with (1), we also introduce an estimate of the contribution to the joint relationship of individual components of X and Y vectors:

$$\Delta D_e(\mathbf{X} \setminus X_i, \mathbf{Y}) = D_e(\mathbf{X}, \mathbf{Y}) - D_e(\mathbf{X} \setminus X_i, \mathbf{Y}),\ i = 1, 2, \dots, 6,$$

$$\Delta D_e(\mathbf{X}, \mathbf{Y} \setminus Y_j) = D_e(\mathbf{X}, \mathbf{Y}) - D_e(\mathbf{X}, \mathbf{Y} \setminus Y_j),\ j = 1, 2, \dots, 5.$$

Results and discussion

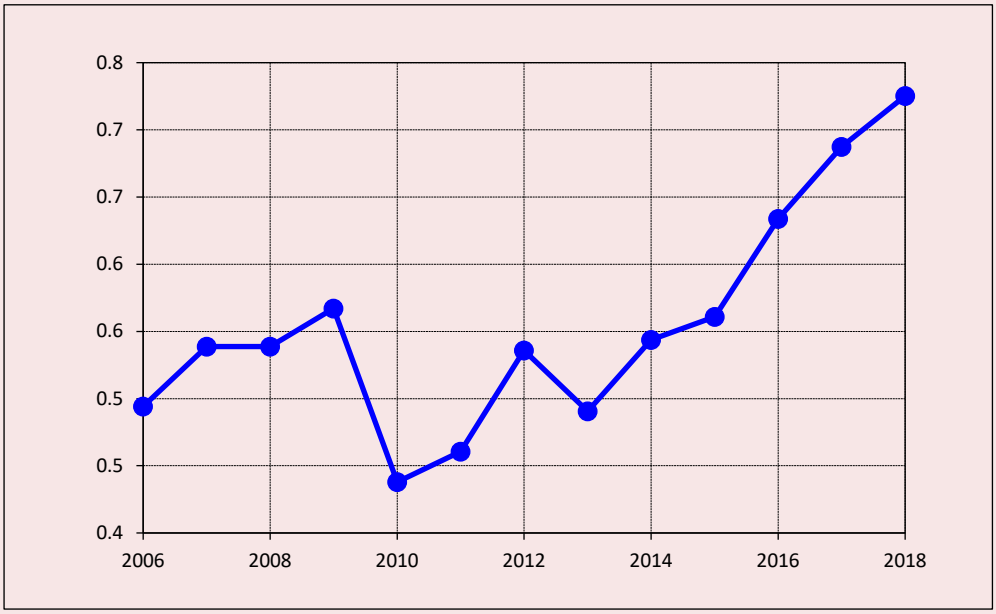
Figure 2 shows the dynamics of the interdependence closenesscoefficient between the indicators of supply and demand factors on the labor market for 2006–2018. Since the need for labor varies significantly over time [1; 28], it is expected that the values of the interdependence closenesscoefficient between the indicators of labor demand and supply factors changed significantly during the studied period with the financial and economic crisis, economic downturn, sanctions against Russia, and countersanctions.

Thus, closeness of the interconnection significantly decreased in 2010, when a negative balance of the movement of jobs was formed after the implementation of several anti-crisis measures – organization of public works and the creation of temporary jobs (in 2009–2010, the economy lost 2.4 million jobs). On the one hand, these crisis measures stabilized the situation on the labor market. On the other hand, in the post-crisis period, they did not contribute to improving the efficiency of employment and economic development.

Since 2014, there has been a trend of establishing a balance on the labor market. O. I. Izryadnova explains such a reaction in difficult macroeconomic condition by the policy of retaining qualified personnel in the conditions of a real reduction in the labor cost, expectations of increased economic activity, and a shortage of labor supply due to demographic factors and the outflow of migrants [29].

The key feature of the Russian labor market is this adaptation to fluctuations of the economic environment that occurs due to changes of the labor price, rather than the level of employment and unemployment [30]. The labor market adapts not by freeing up the labor force, but by expanding the practices of labor relations. In most cases,

Figure 2. Dynamics of the interdependence closeness coefficient between indicators of supply and demand factors on the labor market, 2006–2018



Source: own compilation.

while choosing between laying off employees and transferring them to part-time work, employers selected the latter, and it allowed them to keep unemployment at the same level. During economic instability, a number of part-time workers increases [31]. According to Rosstat, in 2012–2018, the share of such employees increased from 5.2 to 11.0% *(Tab. 2)*, and it continues to grow. The highest

Table 2. Change in the number of employees of organizations engaged in part-time work, by type of economic activity, in % to a list number of employees

	2012	2014	2016	2018
Total	**5.2**	**9.9**	**10.7**	**11.0**
Agriculture, hunting, and forestry	3.7[a]	7.3	8.1	9.8[b]
Mining operations	2.3	6.9	8.3	8.8
Manufacturing industries	8.9	21.3	22.0	21.2
Production and distribution of electricity, gas, and water	2.0	6.1	7.0	7.2[c]
Construction	5.6	15.4	18.1	17.6
Wholesale and retail trade; repair of motor vehicles, motorcycles, household goods, and personal items	2.8	7.2	8.5	9.9[d]
Hotels and restaurants	n/d	21.6	26	29.8[e]
Transport and communications	3.2	11.3	12.6	10.1[f]
Financial activities	1.9	6.1	7.1	8.8[g]
Real estate transactions, rent, and provision of services	n/d	10.8	11.8	9.8[h]
Education	n/d	6.7	6.8	7.6
Healthcare and social services work	n/d	6.3	7.0	8.1
Provision of other public, social, and personal services	n/d	8.7	9.7	12.0[i]

End of Table 2

References:
1. Number of part-time employees in organizations:
- at the initiative of an employer;
- by agreement between an employee and an employer;
- those who were unemployed due to the fault of an employer and for reasons beyond the control of an employer and an employee;
- those who were granted leave without pay at the request of an employee.
2. Taking into account changes in the All-Russian Classifier for Economic Activities:
a – Logging operations
b – Agriculture, forestry, hunting, fishing, and fish farming
c – Provision of electricity, gas and steam; air conditioning
d – Wholesale and retail trade; repair of motor vehicles and motorcycles
e – Activities of hotels and catering establishments
f – Transportation and storage
g – Financial and insurance activities
h – Activities related to real estate transactions
i – Provision of other types of services
Source: Rosstat data.

increase rate of this indicator was recorded in the construction sphere: after the investment downturn, the share of list part-time workers grew up from 5.6 to 17.6%. Such high level of part-time employment keeps unemployment down, but, simultaneously, the labor market underperforms.

Thus, with a narrowing labor supply mostly caused by demographic trends, there has been a reduction in labor demand since 2014 influenced by a decline in economic growth. It has led to an increased tight balance between labor demand and its supply. The growth of partial and part-time employment has become a key process in coordinating supply and demand on the labor market.

Table 3 presents an assessment of an average contribution of each studied supply and demand factor to ensuring the balance on the labor market for 2006–2018. Since the contribution values of factors like the unemployment rate, share of

Table 3. Average contribution of labor demand and supply factors to ensuring the balance on the labor market for 2006–2018

Factor	Average contribution value
Demand factor	
X_1 – Degree of deterioration of fixed capital for the full range of organizations, %	0.074
X_2 – Indices of the physical volume of investments in fixed capital, in comparable prices, as a percentage of a previous year	0.030
X_3 – Unemployment level among population aged 15–72 years, %	0.085
X_4 – Labor productivity index, as a percentage of a previous year	0.052
X_5 – Index of physical volume of the gross regional product, in constant prices, as a percentage of a previous year	0.065
X_6 – Labor market tension coefficient, unit	0.062
Supply factor	
Y_1 – Employed in the informal sector, as a percentage of total employed population	0.061
Y_2 – Labor force participation rate of population aged 15–72, %	0.070
Y_3 – Population with higher and secondary vocational education, as a percentage of workforce	0.080
Y_4 – Number of employed people entering work, as a percentage of a number of employed people in a corresponding region	0.043
Y_5 – Employment among population aged 60–72 years, %	0.096
Source: own compilation.	

population with higher and secondary vocational education in the structure of economically active population, and employment of population aged 60–72 years are quite significant and remain stable, we can conclude that they do have an impact on the functioning of the labor market.

Employment of population aged 60–72 years provided the greatest contribution to ensuring the balance between indicators of supply and demand factors on the labor market. This is an indication of its high potential in meeting labor demand. Employment among population of the older age groups has responded more sensitively to the reduction in the need for labor in certain economic sectors. A.L. Lukyanova and R.I. Kapelyushnikov's analysis of employment among population [32], based on the Rosstat labor force survey for 2005–2017, showed that the decline in employment in the manufacturing industry occurred among the older population with a significant advance in comparison with all other age groups. Moreover, the employment of older people in education and healthcare fields has increased. It is explained by a low attractiveness of these spheres for most young workers. In this regard, a labor resource like labor force of elderly population can fulfill the deficit on the labor market. As noted by M. Ivanova, A. Balaev, E. Gurvich, the growth of labor supply in older age groups is a necessary condition for the equilibrium of the Russian labor market in the medium term [33; 34]. Currently, many countries are actively developing and implementing public policies to stimulate and support employment among older people, since they contribute, on the one hand, to the growth of the economy, and, on the other hand, to the well-being of an ageing society [35].

Conclusion

In this paper, we propose an original formula for calculating the closeness coefficient of the correlation relationship between two random vectors (sets of indicators of supply and demand factors on the labor market). The research, based on the calculation of this coefficient, allowed considering the factors of their formation and making quantitative estimates. Indicators of factors of demand for labor and its supply adequately characterize the labor market, and they can be used for studying employment. The assessment of the closeness of the relationship between two sets of indicators assesses the equilibrium on the labor market as a dynamic process that is influenced by the factors of demand and supply formation.

The results of the study showed that there has been a trend of establishing a balance between the demand for labor and its supply since 2014. In difficult macroeconomic conditions, the Russian labor market has adapted not by freeing up the labor force, but by expanding labor relations practices (including means of underemployment) while maintaining a low unemployment rate. Economic downturn has led to a reduction in the need for labor that, on the background of a narrowing supply of labor resources caused by population's ageing, has strengthened the balance between supply and demand on the labor market. The growth of partial and part-time employment has become a key process in reconciling the demand for labor and its supply. Currently, the "coronavirus crisis" has intensified this trend, new forms of employment actively develop on the labor market, and the so-called "hidden unemployment" is growing. V.E. Gimpelson and R.I. Kapelyushnikov's study based on the Internet-survey "Work and Employment during the Epidemic"[6] showed new adaptation forms on the Russian labor market.

[6] HSE experts study how the Russian labor market is adapting to the COVID-19 crisis. National Research University "Higher School of Economics". Available at: https://www.hse.ru/news/expertise/369700469.html (accessed: December 1, 2020).

The inclusion of factors in the model allowed assessing their impact on the equilibrium on the labor market. The most significant factor among all indicators of supply and demand on the labor market was the employment of population aged 60–72 years.

A significant excess of closeness inter-dependence coefficient between the indicators of factors of labor demand and its supply for individual regions, compared with the all-Russian indicator, indicates the presence of existing differentiation and specifics on regional labor markets.

The study of the interaction of factors of labor demand and its supply formation will allow assessing possible further trends on the labor market, which is especially important in conditions when population's ageing becomes a significant constraint in the formation of employment. It is necessary to create conditions for expanding the employment forms (including new ones: outstaffing, smartstaffing, outsourcing, etc.) and stimulating labor activity among elderly population to achieve a balanced labor market. Diversified employment relations will improve the adaptation of the labor market to various socio-economic challenges, but the realization of its potential benefits depends on institutions and policies that require productive employment of potential workers.

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Limitations of Social Partnership between Authorities and Business in Forming Tourist Attractiveness of Municipalities of the Russian Federation*

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Abstract. Social partnership between authorities and business is a strategic factor of a territory's socio-economic development and increase of the level of competitiveness among local tourist products and services. The purpose of the study is to identify the key limitations in the formation of social partnership between government and business in the context of solving the issues of developing the tourist attractiveness of municipalities of the Russian Federation. The authors used general scientific research methods (generalization, systematization, etc.) and analytical procedures based on comparative and system analysis methods. The key method was a questionnaire survey of experts – heads of municipalities (N = 306). The study was conducted in 2019. As a result of the survey, we identified the key problems of implementing social partnership projects in the tourism sector that do not allow local authorities to form sustainable interaction strategies with business: lack of interest among business, unfavorable investment climate, lack of efficient support for projects in mass media, etc. The authors justified the expediency of using municipal property on the principles of the cooperation economy as a tool for the development of social partnership in the tourism area. By summarizing successful practices of business participation in the development of municipal tourism and analyzing the survey results, we developed the areas for improving activities of local authorities to create conditions for the formation of tourist attractiveness based on social partnership (creation of museum and tourist clusters, branding of the territory, active informational support and popularization of tourist destinations in mass media, organization of project offices for tourism development, etc.). The authors conclude that the institutional environment for the development of social partnership in the tourism area is currently at the formation stage. It requires further study.

Key words: municipality, social partnership, local community, local government, business, tourist attraction.

Introduction

Integration of business and government interests is one of the most significant factors in the economic development of the state and its territories. Social partnership, as a form of cooperation between government and business, is currently considered by experts as an actual trend in transformation of management practices.

Social partnership practice between business and government is particularly relevant in the tourism sector. Today, tourism is positioned as a highly profitable and dynamically developing economic sphere which has a significant impact on quality and pace of socio-economic development of individual regions and municipalities. According to the World Travel and Tourism Council (WTTC), the tourism industry creates 1 in 10 jobs (313 million) worldwide[1]. As one of the largest economic sectors, in 2017 tourism industry showed growth of 4.7% which is higher than global average growth rate of 1.7%; in 2019, 10.3% of world GDP was accounted for tourism industry, for Russia this share was 3.9%[2]. Undoubtedly, the COVID-19 pandemic has significantly transformed the image of outbound tourism (international tourist trips in Russia decreased by 99.0%, the United States – by 95.8%, Spain – by 99.1%, Thailand – by 100%[3]); however, according to some experts, the

[1] *Official web-site of the WTTC*. Available at: https://www.wttc.org/ (accessed: December 12, 2020).

[2] *Federal State Statistics Service*. Available at: https://rosstat.gov.ru/folder/313/document/100185 (accessed: December 12, 2020).

[3] *Ibidem*.

closure of international borders has identified new potential growth points for domestic tourism in most countries. This circumstance, together with other advantages of tourism industry development (preservation of ecological balance, low level of environmental pollution, development of social and market infrastructure, growth of local population employment, etc.), becomes a significant factor in the municipalities' sustainable development [1].

Global economic crisis has put on the agenda such issues as social responsibility of business, support for entrepreneurial activity, and risk sharing for implementation of social partnership projects [2]. The COVID-19 pandemic and the sharp decline in profitability caused by epidemic in tourism industry and related industries (hotel, restaurant, cultural and entertainment sectors) require development of new approaches to the formation of an effective institutional environment and "market optimism" for entrepreneurial initiatives [3; 4]. Due to the restrictions imposed and the closure of world destinations popular for Russian tourists, the effective use of social partnership in terms of maintaining competitiveness of domestic market of tourist services is of particular importance.

We should note that competitiveness of local tourist product and services is determined not only by the territory's tourist potential and the presence of significant points of attraction, but also by the quality of tourist services, development of tourist infrastructure and innovative practices of tourist services. The readiness and level of involvement of business community in solving issues of developing municipalities' tourist attraction determine the dynamics of indicators of regional economies, fixity and stability of territories' socio-economic development [6]. Based on the materials of foreign studies, the paper shows the effect of attracting the private sector to managing tourist infrastructure facilities. The level of competitiveness of services, provided to organize tourist recreation, increases due to the rapid business response to transformation of consumer requests, implementation of models of representatives' network behavior of commercial sector [7]; payback period of tourist infrastructure objects is decreasing [8], quality of coordination of modernization processes of tourist destinations under the influence of external factors and internal conditions of territorial development is increasing [9; 10].

The effectiveness of the authorities' policy to support business initiatives determines the demand level for local tourist products and services, and territory's attraction for potential tourists [11; 12; 13]. However, according to official data presented in the Concept of the Federal Target Program "Development of Domestic and Inbound Tourism in the Russian Federation (2019–2025)", domestic market development of tourist services in Russia is hampered by a number of problems among which special attention should be paid to the low pace of modernization and creation of engineering and tourist infrastructure, unsatisfactory condition of tourist attractions and leisure facilities, the lack of long-term credit instruments available to investors allowing recouping investments in objects of the tourist and recreational complex in terms acceptable to investors[4]. We can assume that institutional restrictions on tourist attraction development of Russian territories limit the practice of using social partnership between government and business. In particular, improving access to finance for small and medium-sized enterprises, according to experts, creates a favorable institutional environment for developing partnership strategies of business and government [14; 15], institutional structures at the regional and local levels, ensuring the order of

[4] Concept of the federal target program "Development of Domestic and Inbound Tourism in the Russian Federation (2019–2025)". Available at: https://tourism.gov.ru/upload/iblock/b6a/Концепция.pdf

interaction and taking the necessary measures to resolve conflict situations, creates an organizational basis for respecting mutual interests [16; 17; 18], building formal communication channels [19; 20].

Critical analysis of existing approaches to the study of social partnership and its role in tourism development has shown that scientists' attention is focused on regional problems and practices. In particular, G.A. Gomilevskaya has identified the most effective model of cluster formation by analyzing practical aspects of budget financing of tourist infrastructure in the Primorsky Krai [21]. The study of tourism development dynamics in the Altai Krai is devoted to the work of N.N. Pestnikova, N.G. Prudnikova, O.S. Strizhevoy which analyzes in detail the growth rate of tourist services, the share and structure of the tourist flow in cities and districts of the region [22]. The works of M.S. Guseva and D.V. Amelkina identify factors limiting development of partner practices in tourism sector, based on the Samara Oblast experience [23]. L. Maksanova, T. Bardakhanova, S. Ausheeva highlight tools for assessing the use of the partnership mechanism in tourism [24]. The work of N.I. Magomedova considers development aspects of public-private partnership in the Russian Federation and formation of a qualitatively new level of tourism potential in the context of sanctions [25].

Despite the fact that in regional studies, the issues of tourism development and special role of social partnership are undoubtedly important, at present, the aspects of partnership between business and government at the municipal level are not yet sufficiently studied. This determined the purpose of our work – to identify the key limitations of social partnership formation between government and business in the context of solving the problems of tourist attraction development of Russia's municipalities.

The tasks of the research are:

1) to analyze financial, organizational, and information resources of municipalities that allow implementing social partnership projects with businesses in tourism sector;

2) to consider problems and limitations of building partnerships between government and business in projects for developing tourist attraction of Russia's municipalities;

3) to analyze successful practices of business participation in tourism development at the municipal level;

4) to determine the directions for solving the problems of social partnership between government and business in the field of tourism.

Methodology

The sociological study "Social resources for tourist attraction development of Russian territories" was conducted in 2019 as a part of the RFBR research project "Interaction of key actors of local communities in order to increase tourist attraction of Russian territories: constraints, resources and development technologies". Within the framework of the research, the authors set multi-faceted tasks related to the analysis of the problems of tourist attraction development of Russian territories, identification of key trends and mechanisms for activating social resources. One of the blocks of the questionnaire was devoted to interaction of business and government in the context of tourist attraction development of Russian territories.

The object of the research is interaction practice between municipal authorities and business structures which is framed in social partnership projects. The subject of the work is the possibilities and limitations of social partnership of the use between municipal authorities and business in the context of tourist attraction development of the Russian Federation regions. The emphasis is on

the integration of government and business efforts which is due to the importance of solving domestic tourism problems in the Russian Federation, as well as the need to narrow the field of empirical research with specific tasks of territorial development of Russian municipalities.

Research geography covers all Russian federal districts. At the first stage, there were formed groups of municipalities representing various Russia's federal districts. At the second stage, municipalities are randomly selected taking into account the type of territory (rural or urban), administrative characteristics (urban settlement, rural settlement, urban district, municipal district). The cities of federal significance (Moscow and St. Petersburg) were excluded from the sample due to the truncated scope of powers assigned to municipal authorities. Due to small representation in general population of such types of municipalities as urban districts with inner-city divisions and inner-city districts, they were also not included in the sample. The sample of municipalities by federal district reproduces the structure of general population in proportion to the number of municipalities in the district for 2019. In addition, a number of organizational difficulties did not allow timely obtaining questionnaires from the heads of local authorities in a number of subjects. The final sample consisted of 306 municipalities, while 100 questionnaires were received from the heads of local self-government authorities of rural settlements of 115 municipal districts.

In the course of the work, there were used general scientific methods (generalization, systematization, etc.); the paper uses analytical procedures based on the methods of comparative and system analysis. The key method is a questionnaire survey of experts – heads of municipalities (N = 306). The questionnaires were sent out by e-mail with a cover letter explaining principles of filling out the questionnaire and justifying the research significance. The Committee on Federal Structure and Local Self-Government of the State Duma, the National Association of Territorial Public Self-Government, and the All-Russian Council of Local Self-Government (VSLSG) provided support in collecting information.

Most of the papers present an analysis of realizing public-private partnership projects at the regional level. We analyze social partnership practices at the municipal level. The special novelty of the research case study is to define barriers to implementation of social partnership between government and business at the municipal level identified on the basis of an expert survey. Theoretical significance is determined by systematization of the key limitations of implementation of social partnership projects of government and business in the field of tourism, justification of the ideas of cooperation economy and their interpretation in the context of the use of municipal property as a tool for developing social partnership in the field of tourism.

The results of the study can be applied in the practice of local self-government authorities to overcome the existing stereotypes of unprofitability of social partnership projects in the field of tourism, the effective use of municipal property as a tool for attracting business to solve the problems of local tourism development, building an effective information policy and information coverage of social partnership projects. The case study and conclusions drawn in the course of the research can be useful in developing strategies and plans for developing the tourist attraction of Russian territories, as well as local business support programs. In addition, the analysis of interaction practices between municipal authorities and

business, designed in social partnership projects, as well as the conclusions, made on the basis of it, can be used to optimize techniques and tools for involving people in solving issues of territorial development of local communities.

Research results

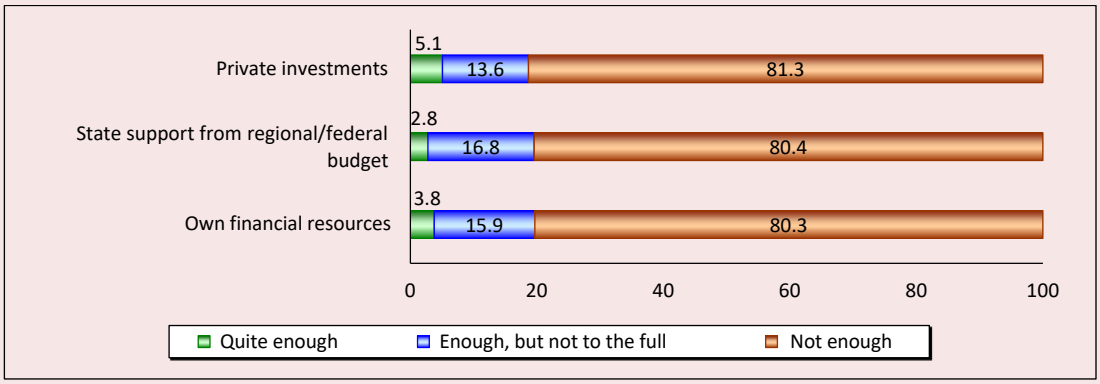
In the course of solving the first research task, the experts were asked to assess the available financial resources of the municipality. The results of the experts' survey indicate the lack of financial support for local budgets *(Fig. 1)* which does not allow local authorities to solve acute socio-economic problems of the territory. In addition, the issues of financial support from the regional budget and attracting private investment are now more acute than ever on the municipal agenda.

We can assume that limited resources do not allow municipalities to initiate social partnership projects in the field of tourism. This circumstance is usually associated with both the secondary role of tourism industry development in the field (due to the presence of traditionally acute socio-economic problems of development of Russian municipalities), and with institutional restrictions in implementing socio-cultural projects of a tourist orientation. In the conditions of low quality of life of the majority of Russia's population, tourism is perceived by the heads of municipalities as a desirable, but not a priority area for territory's development.

Experts note the acute lack of socio-economic resources for tourist attraction formation. In foreign practice, special attention is paid to attracting sponsors and developing patronage, but Russian experts' responses indicate that municipalities are not ready to deal with these issues. It can be assumed that the peculiarities of the Russian mentality and the dominance of paternalistic values limit sponsorship initiatives *(Fig. 2)*. The lack of entrepreneurial activity of population noted by the respondents is a cause for concern, as the tourism sector is mainly represented by the commercial sector. It is difficult to talk about tourist attraction formation of Russia's municipalities with weak development of entrepreneurship in them.

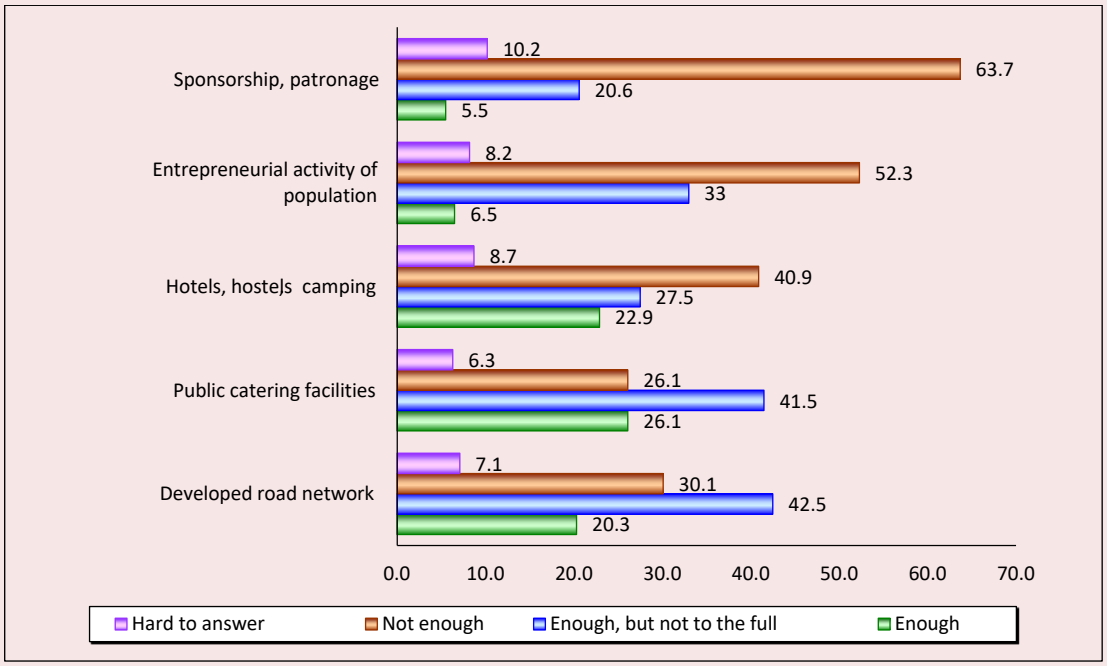
The situation is aggravated by the lack of business interest in participating in social partnership projects. The results emphasize the need for a deeper study of the opinion of business structures on this issue which will help to determine

Figure 1. Assessment of municipalities' provision degree with financial resources for developing territory's tourist attraction, single choice, % of the number of respondents



Source: according to the author's research results.

Figure 2. Assessment of sufficiency degree of socio-economic resources of the municipality for developing territory's tourist attraction, % of the number of respondents



Source: according to the author's research results.

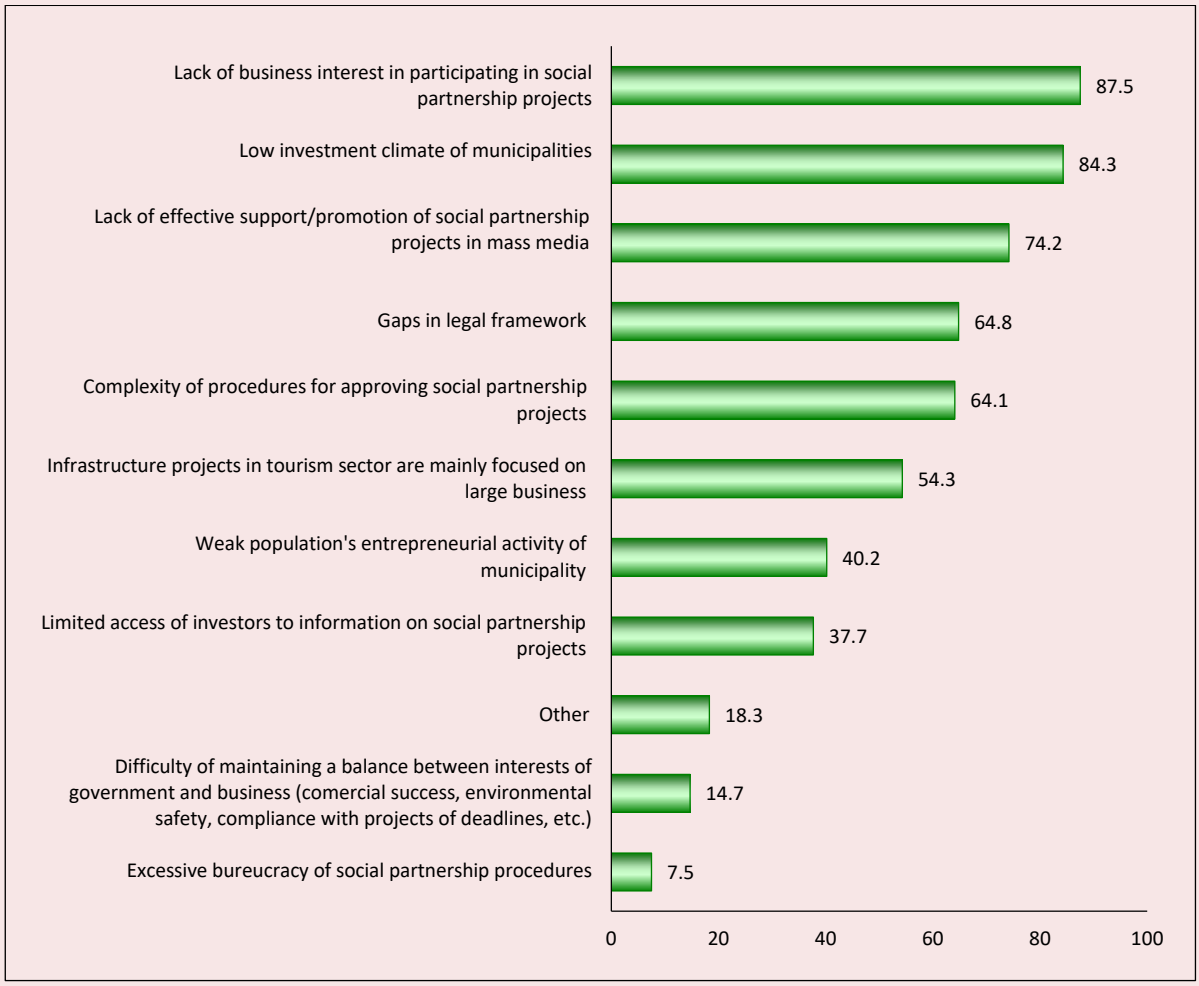
the reasons for their weak interest, possible areas for integrating the efforts of government and business in the territory's tourist attraction development, to establish more popular forms of entrepreneurs' participation in social partnership projects. At the moment, expert assessments allow linking this dysfunction with a weak legal framework and insufficient information support *(Fig. 3)*.

In addition, among the key barriers to the use of social partnership practices in Russian conditions is the complexity of the procedures for approving social partnership projects (64.1%). Shortcomings in development of commercial contracts for partnerships lead to significant dysfunctions and violations of agreements which can trigger negative consequences for both the government and business. Separately, the paper notes that it is difficult to maintain a balance of interests in such areas as commercial success, environmental safety, and compliance with the project implementation deadlines.

Commercial success of government and business partnership projects has been seriously threatened by financial and epidemiological crisis. According to the RBC news agency, the COVID-19 pandemic and the fall in the ruble exchange rate will have a negative impact on more than 340 government and business partnership projects. Representatives of small and medium-sized businesses found themselves in the most vulnerable situation. According to experts, the damage only in the first six months of introduction of quarantine measures will reach 25–30 billion rubles[5].

[5] Experts have estimated the damage to public-private projects due to the virus. Available at: https://www.rbc.ru/economics/25/03/2020/5e79ec309a79474781fd0af3

Figure 3. Distribution of answers to the question "Will you indicate the key problems for building partnerships between government and business in projects to develop tourist attraction of Russia's municipalities?", multiple elections, % of the number of respondents



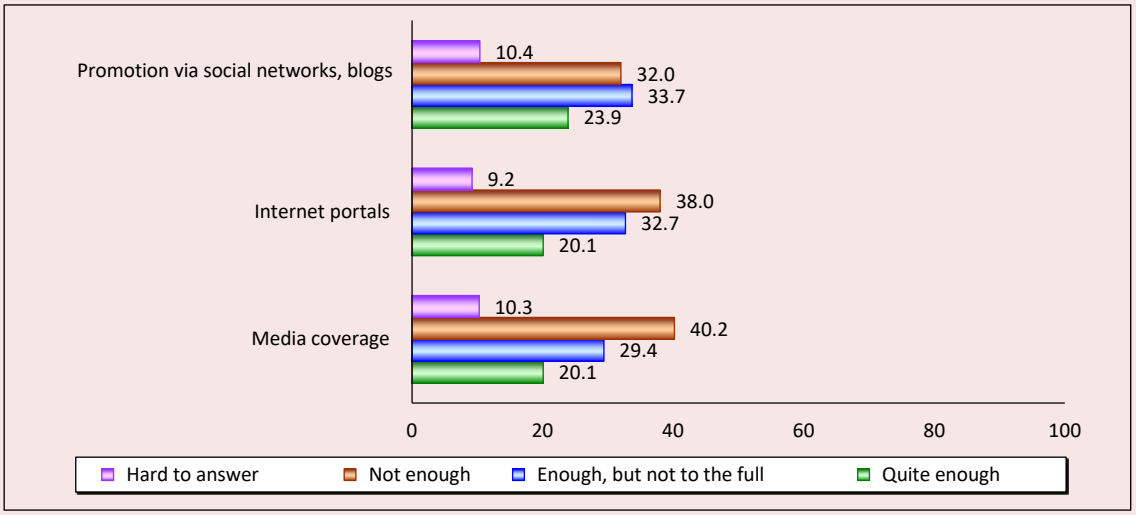
Source: according to the author's research results.

According to the research results, a special place among limitations of formation and development of social partnership between the authorities and local community is occupied by the weak information promotion of such practices in media *(Fig. 4)*.

The authors can assume that the problem is related either to the lack of successful projects of social partnership between government and business in the field of tourism, or to the lack of a high level of media interest in covering this topic which correlates with other expert opinions and studies. In particular, a similar position was revealed by the results of monitoring implementation of social projects in Krasnoyarsk conducted by the Agency of Public Initiatives[6]. According to the Deputy General Director of the Komsomolskaya Pravda Publishing House, R. Karmanov, in order for the interaction based on the principles of social partnership to be

[6] Report on monitoring implementation of projects and evaluating projects' results that received funding under the regional grant program "Social Partnership for Development", evaluating the effectiveness of implementation of the regional grant program "Social Partnership for Development" for 2011. Krasnoyarsk: KROO "Agency of Public Initiatives", 2011. 57 p. Available at: https://kras-grant.ru/about/otchet-gp2011.pdf

Figure 4. Distribution of answers to the question "Will you indicate whether the following information channels are sufficiently used to promote projects of social partnership between government and business in the field of tourism?", % of the number of respondents



Source: according to the author's research results.

effective, an intermediary is needed between the media and the participants of social partnership in order to adapt the texts into a structured product that is understandable for media[7]. Currently, in Russia, the Social Information Agency (SIA) mainly carries out activities to promote social projects. It specializes in covering the topics of NPO, charity, volunteerism, and social responsibility. A special role should belong to the regional and local press which can provide effective information to the public and involve population in the discussion of various issues [26].

According to the results of the analysis of the open question *"Will you indicate the key forms/directions of interaction between government and business in the field of tourism development which, in your opinion, are the most effective/viable in modern conditions"*, the following answers received high recognition from experts:

– long-term strategic cooperation with business on the issues of solving specific tasks of developing territory's tourist potential which, at the same time, do not affect the ownership relations of partners (for example, "service contract", "agreement on the promotion of a tourist product");

– business community participation in implementation of programs involving financial support for tourism initiatives, programs with public, private or mixed ownership (for example, "rent of municipal property for tourism purposes").

Discussion

Social partnership between business and government allows integrating the advantages of the commercial sector (innovation, technical knowledge and skills, organizational efficiency, entrepreneurship) into the territory's tourist attraction development [27]. The basis for implementing productive cooperation strategies is the ability and willingness of local authorities to form strong working relationships with partners [28], and the resource support of project activities [29].

[7] Socially responsible business and media: how to establish a dialogue? Available at: https://www.oprf.ru/press/news/2019/newsitem/48084 (accessed: October 12, 2020).

As the practice of a number of Russian municipalities shows, active policy of local authorities to involve business structures in the local tourism development processes contributes to the growth of representatives' trust and involvement of local communities in social partnership projects. Active position of local authorities, supported by measures of information promotion, consulting support and informal interaction practices, leads to mobilization of resources of local community in order to develop tourist attraction of municipalities. In conditions of limited municipal budgets, such an approach to social partnership projects is extremely important, as it contributes to the development of private museums and workshops, micro-entrepreneurship, and growth of investment attraction of the territory for larger players in tourist market. A striking example of the effective work of the municipal authorities in this area is the history of Myshkin. Initially, tourist traffic volume in it was small which was due to the lack of necessary tourist infrastructure (accommodation, food, etc.), as well as low brand awareness among potential consumers. Its increase was due to the active involvement of the local community in tourism development: the proportion of local residents in relation to tourists was established at 1:34 which provided a multiplier effect for the territory's development[8].

The presented practice of the tourism industry development within the borders of a small town indicates that a municipality that does not have a rich cultural heritage can become an object of tourist display due to the concentration of efforts on the part of local authorities to create a brand of the territory and actively promote it. Having your own brand for municipalities can make them attractive to tourists, will help to activate the initiatives of the local community and integrate them into the territory's development. At the same time, tourism should be one of the priorities in the municipality's development strategy which will not only ensure a steady tourist flow, but also increase the municipality's investment attraction.

At the same time, positive practices of business participation in the development of tourism at the municipal level are usually limited, implemented in the form of projects of municipal-private partnership between 2–3 participants on the basis of concession agreements with an average implementation period of 30 years. Examples are such projects as "Reconstruction and Further Use of the Property Complex for Recreation Facilities" (Belgorod, Lipki tract), "Reconstruction of the Object for Realizing Activities in the Field of Tourism" (Cherepovets, Vologda Oblast), "Reconstruction and Operation of the Object "Health and Recreation Center "Nizhnekamsk Baths" (Nizhnekamsk, Republic of Tatarstan), etc.

The results of the research have proved that the municipalities' financial capabilities determine the boundaries and potential for implementing interaction projects between business and government. On the one hand, the low level of financial security of local budgets does not allow local governments to have a sufficient economic base to act as a potentially attractive partner for business. On the other hand, due to the existence of financial problems in municipalities, the formation of organizational mechanisms for supporting joint projects with business is not fully ensured. Sufficiency of human resources in local administrations determines the effectiveness of information and consulting assistance to business, the timely prevention and regulation of conflict risks of joint activities. This conclusion is supported by international studies. I. Marques

[8] Myshkin has entered the top most visited small towns in Russia. Available at: https://myshkin-info.ru/news/2019/08/08/Myshkin_voshyol_v_desyatku_samyh_poseschaemyh_Malyh_Gorodov_Rossii/ (accessed: October 2, 2020).

argues that the differences in the administrative capabilities of regional and local governments explain the uneven development of public-private partnership projects. Strong administrative capacity, political responsibility, and provision of resources (human and financial) for management practices are important [16]. Russian municipalities are characterized by the following problems of staffing: restrictions on the number of employees of local administrations, the lack of a significant number of municipal employees of specialized education, insufficient legal and economic training [30]. These dysfunctions do not allow municipal employees to initiate and support joint projects with businesses in a timely manner, and to provide adequate consulting assistance, especially in conditions of fairly high legal uncertainty.

In Russia, there is a noticeable level of municipalities' differentiation according to the level of profitability of local budgets. Large urban settlements have a strong position and proximity to the administrative centers also ensures the territory's investment attraction.

The results of the study have showed that the majority of municipalities have difficulties in providing financial support for even basic powers related to the life support of population. As a result, in many municipalities of the Russian Federation, there is practically no system for monitoring business problems, and no diagnostics of the effectiveness of implemented measures and programs to support business sector is carried out [15]. The lack of human and financial resources puts rural settlements and small towns of the Russian Federation in a vulnerable position, and limits their initiatives to develop partnerships with business.

At the same time, small and medium-sized towns have municipal property that is not always used effectively. This resource, as a rule, remains not involved in social partnership projects. At the same time, "empty" objects of municipal infrastructure can be provided to investors on preferential terms in order to create new tourist points of attraction (museums, art spaces, etc.). One of the examples of such successful cooperation between government and business is the project of social entrepreneurship museum "Kolomenskaya Pastila" which is a part of the museum and creative cluster "Kolomenskii Posad". This project's implementation allowed not only preserving the town's cultural heritage, but also strengthening the territory's brand, to develop such new areas as gastronomic tourism and creative industries. The creation of a technical library and a museum of the machine tool with the history of the Tula industry made possible only through the use of empty areas of the Oktava plant. As a result, this project contributed to preservation and popularization of the town's industrial heritage and became a new object of tourist display.

The active use of municipal property in tourism industry development will allow creating museum and tourist clusters. As a result, it will be possible to develop cultural and educational tourism by attracting all interested parties: local governments, investors and local community which will contribute to the formation of social partnership. In specific tourist destinations, management of such clusters will ensure a stable tourist flow and formation of a comfortable tourist environment.

The research results have proved that the lack of additional financial opportunities for local authorities does not allow for an effective municipal policy aimed at interacting with business in tourism sector. The problems are related to the narrow range of variability of management actions in determining priority areas of budget spending, and high dependence of local self-government on regional and federal authorities. The findings are

supported by other studies. The formation of a polycentric management system and growth of the municipalities' authority ensure sustainable socio-economic development of the territories improving population's quality and living standards of, and entrepreneurial activity [31; 32]. The provision of local autonomy is considered as a guarantor of implementation of strategic goals for the territory's development, implementation of local tasks [33].

The limitations of implementing social partnership projects in the field of tourism are the information vacuum on the issues under consideration in the mass media, the established stereotypes of the unprofitability of these projects. In modern conditions, the involvement of business in solving issues of socio-economic development of the territory does not provide sustainable reputational benefits. A possible way out of this situation is to focus the efforts of municipalities on ensuring information openness of business and government interaction strategies, providing wide access to information for potential investors, and large-scale coverage of upcoming projects in the regional and municipal press. No less important is the targeted development of participation models with potential investors. Consulting support should include an analysis of investment risks, working out mechanisms for reducing them, lending models, and attracting additional participants. Public support for entrepreneurial activity in the tourism sector is considered as a driver for the implementation of successful strategies of social partnership between government and business. The increase in the reputational benefits of entrepreneurs involved in the development of local tourist products and services, construction and operation of tourist infrastructure facilities can be achieved through the coverage of their activities in local press, recognition, and moral incentives.

Conclusion

The severity of Russia's traditional socio-economic problems and relatively low living standards in most municipalities do not allow the municipal authorities to focus on developing tourism industry as a whole. In view of this circumstance, we conclude that institutional environment for developing social partnership practice in the field of tourism is at the stage of formation.

The heads of municipalities note the following barriers to the formation of partnerships with business to develop tourist attraction of Russia's territories:

– financial: insufficient own financial resources of municipalities, low level of state support from the regional/federal budget, lack of private investment;

– legal: gaps in legal framework, confusing procedures for approving social partnership projects, shortcomings in development of commercial contracts for partnerships, violation of agreements;

– organizational: difficulty of maintaining a balance of interests in such areas as commercial success, environmental safety, compliance with the project implementation deadlines, the lack of qualified municipal personnel, excessive bureaucracy inherent in the authorities, information closeness of the authorities and the lack of effective support for the practices of social partnership between government and business in the media. There is a low level of trust between the government and business, and the lack of interest among entrepreneurs in participating in social partnership projects.

To boost tourism activity at the municipal level, tourism should be one of the priority areas in the municipalities' development strategy. Local authorities should participate in the formation of tourist products and creation and promotion of the

territory's brand which will help both attract private investors and increase the activity of the local community. In addition, the creation of project offices for tourism development at the municipal level can serve as a catalyst for promoting the territory's tourist potential and attracting business to the projects' implementation in this area.

In a crisis, the formation of museum and tourist clusters on the municipalities' territory can help strengthen partnership of local governments, business and public. The cluster approach in tourism industry development will provide a multiplier effect. The joint use of tourism resources, the presence of common priorities, cooperation and collaboration between all the cluster subjects will contribute to the formation of trust between them.

The *table* systematizes measures to overcome barriers of social partnership between government and business in tourism sector. The financial insufficiency of local budgets actualizes organizational measures that do not incur serious costs. Overcoming legal barriers requires in-depth study of the regulatory framework and development of legislative initiatives which can be the subject of separate scientific research.

Increasing the level of business interest in participating in social partnership projects involves implementation of a number of proposals. Based on the analysis, the authors consider it appropriate to conduct a targeted information policy which would include the creation of a single information portal that consolidates information about potential and ongoing social partnership projects, a database of successful practices and feedback from direct participants in project work. It is also possible to prepare information events and their coverage in the media; formation of information content about social partnership projects and its broadcasting in the form of social advertising, outdoor advertising, etc. The elimination of the information vacuum will allow business structures to determine the limits of possible participation in social partnership projects. The next proposal is to improve the procedure for legal advice to representatives of business structures including legal support for business in social partnership projects. This approach will help to increase the confidence level of the commercial sector in social partnership projects, as well as openness and transparency of the legal framework for organizing partner projects. On the basis of the

Measures to overcome barriers of social partnership between government and business in the field of tourism

Barriers	Measures
Organizational	Concentration of the municipalities' efforts is on ensuring the information openness of the strategies of interaction between business and government, providing wide access to information for potential investors, and large-scale coverage of upcoming projects in the regional and municipal press; consulting support by municipalities for representatives of business community to participate in social partnership projects including through creation of project offices and involvement of qualified specialists in this field; implementation of a system for monitoring business problems, diagnostics of the effectiveness of business sector support programs; media coverage of the activities of entrepreneurs involved in development of local tourist products and services, construction and operation of tourist infrastructure facilities.
Financing	Activation of using municipal property, provision of infrastructure facilities to investors on preferential terms in order to create new tourist points of attraction; creating museum and tourism clusters
Legal	Improving legal framework and procedures for approving social partnership projects; inclusion of directions/projects of social partnership in tourism in local regulations/legislative initiatives of local authorities.
Source: own calculations.	

above proposals, it is expected to increase business interest level in participating in social partnership projects.

In the conditions of limited financial resources of most municipalities, the effective use of municipal property can become a resource for increasing business interest in social partnership projects. Its application on the principles of the economy of cooperation will attract additional investors who can not only create new objects of tourist display, but also preserve the cultural heritage of the territory. At the same time, information support is of particular importance. On the part of the authorities, it is necessary to more actively carry out activities to create Internet portals and communication platforms that can bring together all interested parties to develop tourist attraction of Russian territories. Popularization of tourist destinations of municipalities in social networks, as well as through the Internet technologies, will provide an opportunity to ensure the competitive advantages of the territory for developing its tourist attraction.

Thus, the presented directions for improving the activities of local self-government authorities will create the necessary conditions for the formation of the municipalities' tourist attraction on the basis of social partnership.

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Socio-Demographic Characteristics and Quality of Employment of Platform Workers in Russia and the World*

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Abstract. Digitalization of all spheres of life, technological, demographic, social, and other development drivers of the world contribute to the growing scale and depth of platform employment spread. Emergence of digital platforms was a major challenge for organizing and structuring the labor market. Platforms change not only existing business-paradigms, but the employment model. Platform employment in fact becomes a new institutional mechanism on the labor market. We used general scientific methods in the research: system analysis, comparison, description, generalization, systematization, formalization, and special methods – source analysis, SWOT-analysis, expert evaluation method, etc. The purpose of the research is to select and study socio-demographic features of platform workers in Russia and in the world, to compare them and reveal impact of these features on quality and stability of employment among platform workers. The article analyzes, systematizes, and sums up the results of recent European and American studies on socio-demographic features of platform workers. We attempt to assess similar characteristics among Russian workers (freelancers) analyzing sociological surveys and interviews. The author reveals primary signs of this employment type and their impact on quality of workers' labor, compare the features of Russian and foreign platform workers, and conclude that pros and cons of platform workers are unevenly distributed, and experience of platform workers is polarized. It creates real problems for some workers

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and provides opportunities for others. Moreover, we designate risks of platform employment, which is a consequence of its instability, and propose areas for further studies.

Key words: digital labor platforms (DLP), platform employment, platform workers, regulation of platform employment, quality of employment, employment status, precarious employment, work with multiple performers, work on demand.

Introduction

The relevance of our present study is due to the fact that under the impact of numerous economic and social challenges, over the past decades, the scale of platform employment in the world is increasing and its impact on the economy is growing. Digital labor platforms (DLPs) are altering and re-structuring labor markets, changing not only business practices, but also the employment model itself. DLPs are defined as digital networks that coordinate labor service transactions according to certain algorithms. Platforms position themselves as intermediaries or technology services that optimize the balance between supply and demand. However, in reality, they have considerable power, being able to determine key parameters of labor and employment conditions for formally independent workers. Platform employment is becoming a new reality in the labor market, and requires a deep rethinking of labor market institutions. The notion of "employment via digital platforms" does not have a full-fledged official definition, since there are no regulatory criteria to define it, and the interpretation of some terms differs across countries. DLPs operate across and beyond national borders, giving people more opportunities to provide professional and non-professional labor services from all over the world, with the exception of services provided locally. Very often, employees who provide online services operate in low-income countries, and the majority of their customers are located in high-income countries. Thus, the differences in employment and social indicators within the country may decrease, and the exposure of workers to global competition may increase.

Platform employment is in the sphere of interests of foreign researchers [1–7] and major international organizations (Eurofound [8], McKinsey Global Institute [9], OECD [10], BCG [11], European Parliament [12], ILO [13; 14], etc.); as for Russian authors, the number of their publications on the subject is still insignificant [15; 16; 17]. Researchers mainly analyze definitions and terms of platform employment and substantiate its features and properties. The materials of surveys of platform employees conducted by international organizations are of undoubted interest from the point of view of obtaining statistical data, because this new form of employment is not reflected in the statistics of almost any country in the world.

According to expert and statistics estimates [11; 13], platform work is often performed outside of the main work, that is, it is an additional source of income. The legislative gap in relation to platform workers is reflected in the fact that they do not always pay taxes from the income generated by this form of work, which leads to a decrease in tax revenues and the tax base, and also raises the question of the need to adapt the social security and social protection system to the new realities. It is still being discussed whether platform workers belong to the category of payroll employees or whether they should be considered self-employed. In some countries, people whose employment is based on digital platforms have been considered a separate group; but the question of whether new categories of workers should be created remains debatable.

The goal of our research is to identify and study socio-demographic features of platform workers in Russia and the world, compare them and consider the impact of these features on the quality and sustainability of platform workers employment.

The object of the article is digital labor platforms and platform employment. The subject of the article is socio-demographic characteristics of platform workers in Russia and the world, as well as other socio-economic aspects of employment via online platforms.

In the course of the research, we used general scientific methods such as system analysis, comparison, description, generalization, systematization, formalization, etc., and special methods such as analysis of sources, SWOT analysis, expert evaluation method, etc.

Within the framework of the study, we considered platform employment through the prism of socio-demographic and other qualitative and quantitative features that determine quality of employment and are typical of platform workers. Quality of employment is a multidimensional concept with numerous aspects or dimensions that are focused on satisfying human needs in various ways [18]. In particular, international practice distinguishes seven dimensions of quality of employment [19]: 1) safety and ethics of employment; 2) income and benefits of employment; 3) working hours and balancing work and non-working life; 4) security of employment and social protection; 5) social dialogue; 6) skills development and training; 7) workplace relationships and work motivation. Quality of employment cannot be analyzed outside the Decent Work Indicators defined by the International Labour Organization[1]. In the course of the study, platform employment was analyzed in the context of these indicators and their impact on the degree of its instability.

[1] Measuring decent work on the basis of recommendations of the Tripartite Meeting of Experts on the Measurement of Decent Work. Available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---integration/documents/meetingdocument/wcms_192844.pdf (accessed: March 15, 2021).

Research findings

Information base of the research

Estimates of the composition of platform workers in the United States are provided according to The Gig Economy Data Hub[2], which is a joint project of the Aspen Institute's Future of Work Initiative and Cornell University's ILR School.

Estimates of the composition of platform workers in the EU have been made according to a number of studies:

1. The COLLEEM pilot survey, an initial attempt to provide quantitative evidence on platform work. The survey was conducted in 2017 by the Joint Research Centre and covered DLPs in 14 EU member states [20].

2. Boston Consulting Group (BBG) 2018 survey [11]. The sample consisted of 11,000 people from 11 countries (1,000 people in each country).

3. European Parliament Survey (2017); 50 interviews were conducted in eight European countries, and 1,200 platform workers were interviewed [12].

4. Surveys of platform workers of the International Labour Organization (ILO). Two surveys were conducted: in 2015 (1,167 and 677 people) on the Amazon Mechanical Turk (AMT) and CrowdFlower platforms, and in 2017 (2,350 people) on five platforms: AMT, CrowdFlower, Clickworker, Microworkers and Prolific [13; 14].

Estimates regarding the composition of platform workers in Russia were made based on the following surveys:

1. Data from the Workspace portal, which surveyed 3,000 freelancers from its own database in December 2019 – February 2020[3].

2. "Research of Freelancer Service Customers 2020" – a sociological survey conducted by the IT holding TalentTech, the National Research University "Higher School of Economics" and

[2] Gig Economy Data Hub. Available at: https://www.gigeconomydata.org/ (accessed March 15, 2021).

[3] The challenges and joys of a typical freelancer in 2020. Available at: https://workspace.ru/blog/the-challenges-and-joys-of-a-typical-freelancer-in-2020/ (accessed: March 15, 2021).

the Russian freelance exchange FL.ru [21]. The survey was conducted from January to July 2020 and involved 225 people who used the services of freelancers and interacted with them as representatives of organizations or individuals over the past year.

3. Data from surveys conducted by the All-Russian Public Opinion Research Center (VTsIOM) on the opinion of Russians about freelancers and their activities (March 2020) [4].

4. 16 expert interviews with platform workers (mainly in the field of providing tutoring services) that we conducted in the period from September 1 to December 1, 2020. Among the respondents, ten are women and six are men. The age of the respondents varies from 27 to 64 years, 14 people live in Moscow, one – in Yekaterinburg, one – abroad.

Platform employment coverage

At present it is very difficult to make accurate estimates of the number of platform workers on a global scale due to the ambiguity of the terms and definitions used and the criteria for inclusion of individuals in the category of platform workers. Estimates of the scale of platform work in the world are discussed in detail in [2; 7; 8; 17; 20]. In general, the share of platform workers in the United States and European countries in 2016–2019 was estimated at 1–5% of total employment. In developing countries, the scale of the platform economy is much larger, especially if we take into account those workers who receive additional, rather than main, income from platform employment [11]. Data on the number of platforms in Europe vary even more: from five (Cyprus) to 300 (France) [8]. The 2020 pandemic has adjusted these numbers. The seventh annual Upwork survey (September 2020), which surveyed more than 6,000 American workers over the age of 18, found that 59 million Americans (36% of the US workforce) participated in platform work over the past 12 months, i.e. their number increased by two million over 2019[5]. According to the UK freelance platform PeoplePerHour, since the beginning of 2020, the number of its subscribers has grown by 513% in Japan, by 329% in Spain and by 300% in the UK[6].

EU estimates show that on average 10% of the adult population has ever used online platforms to provide certain types of labor services *(workers with a small share of platform employment)*. Less than 8% do this kind of work with some frequency, less than 6% spend a significant amount of time on it (at least 10 hours a week) or earn a significant amount of income (at least 25% of the total) – these are *workers with a significant share of platform employment*. *Main platform workers* are those who earn 50% or more of their income via platforms and/or work via platforms more than 20 hours a week. They account for about 2% of the adult population on average. The UK has the highest incidence of platform work. Countries with high relative values of platform employment are Germany, the Netherlands, Spain, Portugal and Italy. By contrast, Finland, Sweden, France, Hungary, and Slovakia show very low values compared to other countries [20].

There are no generalized data on the number and composition of Russia's platform workers, so we can use publicly available information from companies, as well as findings of individual sociological surveys. The scale of platform employment in Russia can be estimated only indirectly, by considering each of the categories that make up the concept of "platform worker".

In Russia, platform workers belong to several categories (these categories may overlap): self-

[4] Russians came to love freelancing. Available at: https://wciom.ru/index.php?id=236&uid=10183 (accessed: March 15, 2021).

[5] New Upwork Study Finds 36% of the U.S. Workforce Freelance Amid the COVID-19 Pandemic. Available at: https://www.upwork.com/press/releases/new-upwork-study-finds-36-of-the-us-workforce-freelance-amid-the-covid-19-pandemic (accessed: March 15, 2021).

[6] How the pandemic has affected the work and prospects of independent workers. Available at: https://www.vedomosti.ru/partner/articles/2020/09/07/838503-pandemiya-povliyala

employed; freelancers; individual entrepreneurs; unregistered workers; employees for whom DLPs provide secondary income; schoolchildren and students (in statistics, they are unoccupied and economically inactive); individuals who work on the basis of a civil law contract, the subject of which is the performance of works and (or) the provision of services, and individuals who work on the basis of an author's commissioning agreement. In addition, the terms "professional income tax payers", "self-employed persons", "freelancers" and others are used. This creates an issue of uncertainty about their employment status in the labor market.

The term "self-employed" has not yet been defined by law, but the Federal Tax Service clarifies[7] that self-employment is a form of employment in which a citizen earns income from their professional activities (for example, provision of services or works, sale of goods they produce) in the implementation of which they are not in an employment relationship with an employer, are not registered as an individual entrepreneur and do not hire employees.

Russian practice has no well-established methodology for defining the term "freelancer", which is confirmed by the results of sociological surveys[8]. According to respondents, a freelancer is someone who finds a job on their own, a free worker (15%), as well as someone who works for themselves (5%) or remotely (5%). These interpretations mix forms of employment, types of labor relations, and ways of doing work. Working as a freelancer really means working outside of the company staff. A freelancer finds clients, does the work, and gets paid for it. There are many ways to find clients, but mostly freelancers offer their services on specialized online resources (DLPs, online labor exchanges) or through personal connections. Freelancing is especially common in such fields as journalism (and other forms of activity related to writing texts), law, programming, architecture, design (advertising, web design, interior design, etc.), translation, photography and videography, expert and consulting activities; it is also often found in the construction field. Freelancing is a mechanism, the essence of which is that a certain individual or firm hires a person to perform a certain task, without putting them on the payroll. The worker may be located in another city or even another country, but may also work in the customer's offices. Russian customers noted the low cost of services and various forms of cost reduction as important advantages of freelancers in comparison with full-time employees [21].

At the moment, there are one million service offers on the well-known digital platform Avito[9]. The YouDo platform shows offers from more than 1.5 million workers[10]. The number of Russians officially registered as self-employed in the YouDo service has increased eight-fold since the beginning of 2020[11]. The PROFI.RU platform has more than one million registered specialists in 900 types of services in more than 1,000 cities where the service operates[12]. Tutor selection service repetitor.ru employs more than 15 thousand tutors, and since March 2020 it has been working with customers around the world[13]. Obviously, many platform workers register on several platforms at once, which makes it difficult to assess the scale of this type of employment. According to a VTsIOM survey[14], every tenth Russian (11%) can call themselves a freelancer or self-employed.

[7] https://npd.nalog.ru/#questions (accessed March 15, 2021).

[8] Russians came to love freelancing. Available at: https://wciom.ru/index.php?id=236&uid=10183 (accessed: March 15, 2021).

[9] https://www.avito.ru/company (accessed: March 15, 2021).

[10] https://youdo.com/ (accessed: March 15, 2021).

[11] How the pandemic has affected the work and prospects of independent workers. Available at: https://www.vedomosti.ru/partner/articles/2020/09/07/838503-pandemiya-povliyala (accessed: March 15, 2021).

[12] https://profi.ru/about/ (accessed: March 15, 2021).

[13] https://repetitor.ru/about (accessed: March 15, 2021).

[14] Russians came to love freelancing. Available at: https://wciom.ru/index.php?id=236&uid=10183 (accessed: March 15, 2021).

As for the company Uber, it employs more than 22 thousand people in more than 700 cities[15]. In Russia, Uber is currently present in 17 cities, including Yekaterinburg, Kazan, Novosibirsk, and Voronezh[16]. The number of drivers connected to the platform in Russia is estimated in the tens of thousands, but there are no exact estimates in the public domain.

Socio-demographic characteristics of platform workers

Platform workers in the United States[17], Europe [20], and Russia[18] are on average 10 years younger than traditional workers. If the *age* distribution of ordinary workers is normal, then for platform workers it is biased toward the young; moreover, the age decreases with the increase in the intensity of platform employment.

According to the ILO study [13], the average age of platform workers was 33.2 years in 2017 and 34.7 years in 2015. It was different for different platforms. Indian workers were on average younger (31.8 years old) than American workers (35.5 years old). The majority of platform workers are between 25 and 40 years old; 10% are over 50, with the oldest respondents being 83 and 71 in 2015 and 2017, respectively.

According to the estimates of the Eurofound [8], the proportion of people under 35 years of age among European platform workers is significantly higher than among traditional workers. On average, only 5% of platform workers are 56–65 years old (in Austria – 13%, in Estonia – 6%, in the Czech Republic – 4% are 45 to 59 years old and 1% are over 60).

As for *gender* distribution, as the intensity of platform work increases, the proportion of women from the EU who engage in platform work gradually decreases [20]. In particular, women make up 47.5% of offline employees, 40.2% of insignificant platform workers, 31.2% of significant but not main platform workers, and only 26.3% of main and very significant platform workers. The representation of women among platform workers varies greatly across countries. If we look at gender and age in the aggregate, we will notice an even more dramatic division, the proportion of older women gradually decreases as the intensity of platform work increases: 34.2% of those engaged in offline work are women aged 35 and older. This share is almost halved (to 18.7%) among those who provide services from time to time via online platforms, 15.2% of respondents working via platform, and only 10.6% among those for whom platform work is the main source of income. On the contrary, the share of young men increases significantly with an increase in the intensity of platform work: from 12.7% among offline workers to 37.8% among those who receive their main income via platform.

According to earlier (2015 and 2017) data from the ILO [13], women to men ratio for platform workers is one to three. In developing countries, the gender distribution is particularly uneven: only one in five platform workers is a woman.

Data from the Eurofound [8] also show that men are more likely to perform platform work than women. In Austria, men make up 57% of platform workers, in the Netherlands – 60%. A study of five Eastern European countries found that 58% of platform workers were men. In the Czech Republic, 8% of men and 5% of women have experience working on the platform. In Estonia, about 26% of men, compared to 13% of women, have done work via platform at least once in the past.

In the United States, the distribution of workforce by gender depends on the type of survey: men and women participate in different types of

[15] About the company. Available at: https://www.uber.com/ru/newsroom/o_компании/ (accessed: March 15, 2021).

[16] Cities in Russia and countries where Uber taxi operates. Available at: https://taxivopros.ru/klientam-uber/gde-rabotaet.html (accessed: March 15, 2021).

[17] Who participates in the gig economy? Available at: https://www.gigeconomydata.org/basics/who-participates-gig-economy#age (accessed: March 15, 2021).

[18] The challenges and joys of a typical freelancer in 2020. Available at: https://workspace.ru/blog/the-challenges-and-joys-of-a-typical-freelancer-in-2020/ (accessed: March 15, 2021).

platform work[19]. Men are significantly more likely than women to be involved in online work via platforms and are employed full-time. Women are more likely to receive additional income via platforms and work part-time.

This gender imbalance is based on discriminatory grounds. There are studies, for example [2], showing that women suffer statistical discrimination: they are less likely to be hired for jobs that are predominantly male (such as programming), and are more likely to be hired for jobs that are predominantly female (such as customer service).

According to the Russian survey20, among freelancers, the share of women is 46.8%, men – 53.2%, i.e. they are approximately equal. Our own expert interviews also show the gender balance among tutors, but these data are unrepresentative and cannot be extended to the entire population of workers.

The *employment status* of platform workers is one of the most pressing issues in terms of the quality and instability of employment. Estimates from the COLLEEM survey reveal that when asked about their current employment situation, 68.1% of the platform workers claimed to be an employee (68.1%) and 7.6% – self-employed. These answers can be explained in different ways. A first possibility is that platform workers also have a regular job as employees or self-employed and are therefore covered by standard employment legislation. A second possibility is that platform workers are not really sure of their employment status and may see themselves as employees, only because they provide a certain type of service with regularity through the same platform. This is a contradiction, because in most cases the providers of labor services via platforms are formally independent contractors rather than employees. The labor market status of platform workers remains unclear, even to themselves.

According to the freelancers survey21, half of respondents in Russia at the end of February 2020 worked off the books, 16.6% were self-employed, 9.8% worked under a civil law contract, and 23.7% were individual entrepreneurs. At the same time, freelancing is the only source of income for 2/3 of respondents, and a third of respondents have a steady job and use freelancing to earn additional income. Only 10% of organizations conclude a formal contract with freelancers, one third rely on the tools of remote work exchanges, such as secure transactions, etc., and more than half of customers do not formalize their labor relations with freelancers in any way [21].

Platform workers are on average more educated than the comparable general population. Among main platform workers, 55% have a *high education*, compared to 35.3% for the average worker in the EU [20]. According to [13], platform workers are well educated: 37% had a bachelor's degree, 20% – a master's degree. Among the degree holders, 57% had a major in science and technology (12% – in natural sciences and medicine, 23% – in engineering, and 22% – in information technology), 25% specialized in economics, finance and accounting. Data of the survey [11] also show a high level of education of platform workers.

To be able to provide services via platform one needs to be a savvy internet user, and internet use usually correlated with higher education. In addition, many types of work performed via online platforms require a higher than average level of skills, hence platforms could be a tool to improve the allocation of highly skilled workers to highly skilled tasks. This may also be related to the fact that some young and educated workers have difficulties in finding regular employment and resort to platform work to make ends meet.

[19] Who participates in the gig economy? Available at: https://www.gigeconomydata.org/basics/who-participates-gig-economy#age (accessed: March 15, 2021).

[20] The challenges and joys of a typical freelancer in 2020. Available at: https://workspace.ru/blog/the-challenges-and-joys-of-a-typical-freelancer-in-2020/ (accessed: March 15, 2021).

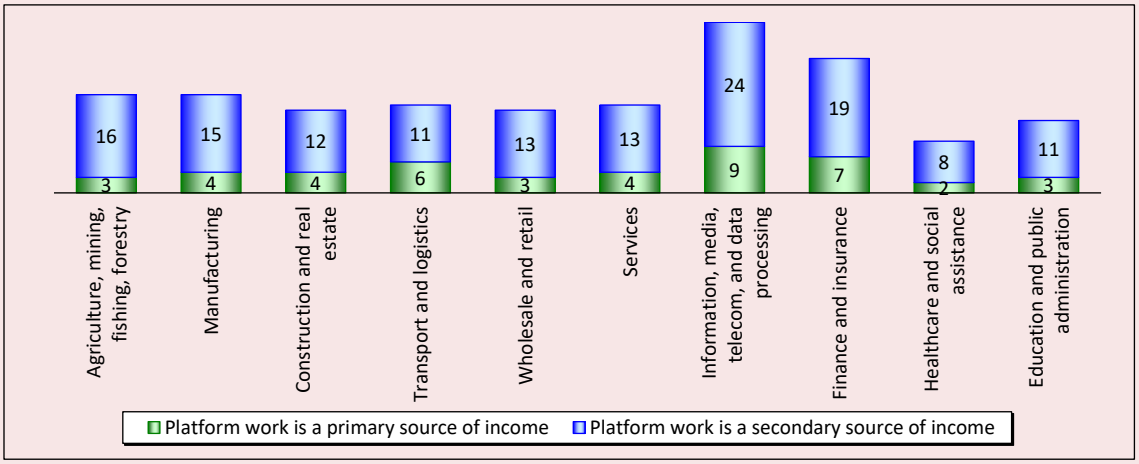
[21] *Ibidem*.

In the U.S., according to most surveys, the platform workforce as a whole is only slightly more educated than the traditional workforce. Freelancers are more likely than traditional workers to have an academic degree. Conversely, temporary workers and on-call workers often do not even have a high school diploma[22]. In the Russian sample, 35.4% have a specialized higher education[23].

Platform employment is represented in almost all industries and it is an additional rather than the main income source for the majority of workers. *Figure 1* shows the distribution of platform workers by industry, according to the study by Boston Consulting Group (BSG).

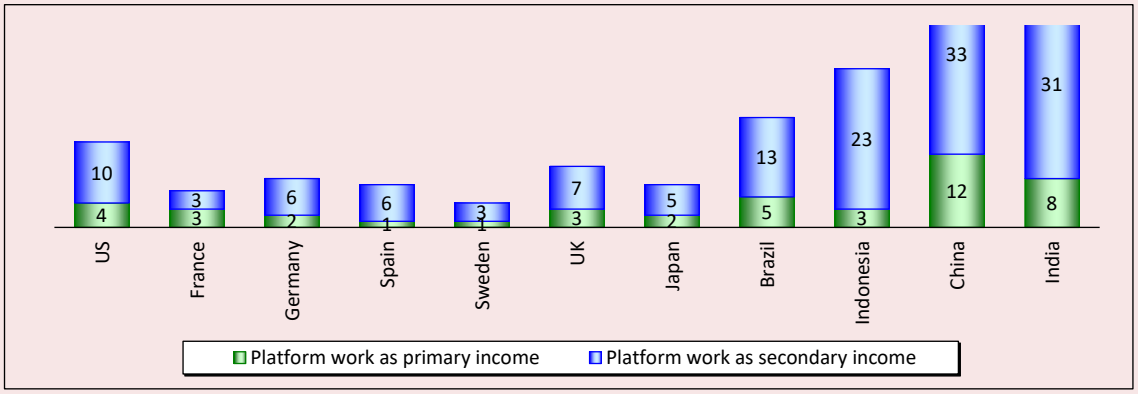
Figure 1 shows that platform work is more often represented in IT, media, telecom, data processing,

Figure 1. Platform workers, broken down by industry, BCG, 2018, % of respondents



Source: Wallenstein J., de Chalendar A., Reeves M., Bailey A. *The New Freelancers: Tapping Talent in the Gig Economy.* BCG Henderson Institute, 2019.

Figure 2. Distribution of platform workers broken down by country, BCG, 2018, % of respondents



Source: Wallenstein J., de Chalendar A., Reeves M., Bailey A. *The New Freelancers: Tapping Talent in the Gig Economy.* BCG Henderson Institute, 2019.

[22] Who participates in the gig economy? Available at: https://www.gigeconomydata.org/basics/who-participates-gig-economy#education-levels (accessed: March 15, 2021).

[23] The challenges and joys of a typical freelancer in 2020. Available at: https://workspace.ru/blog/the-challenges-and-joys-of-a-typical-freelancer-in-2020/ (accessed: March 15, 2021).

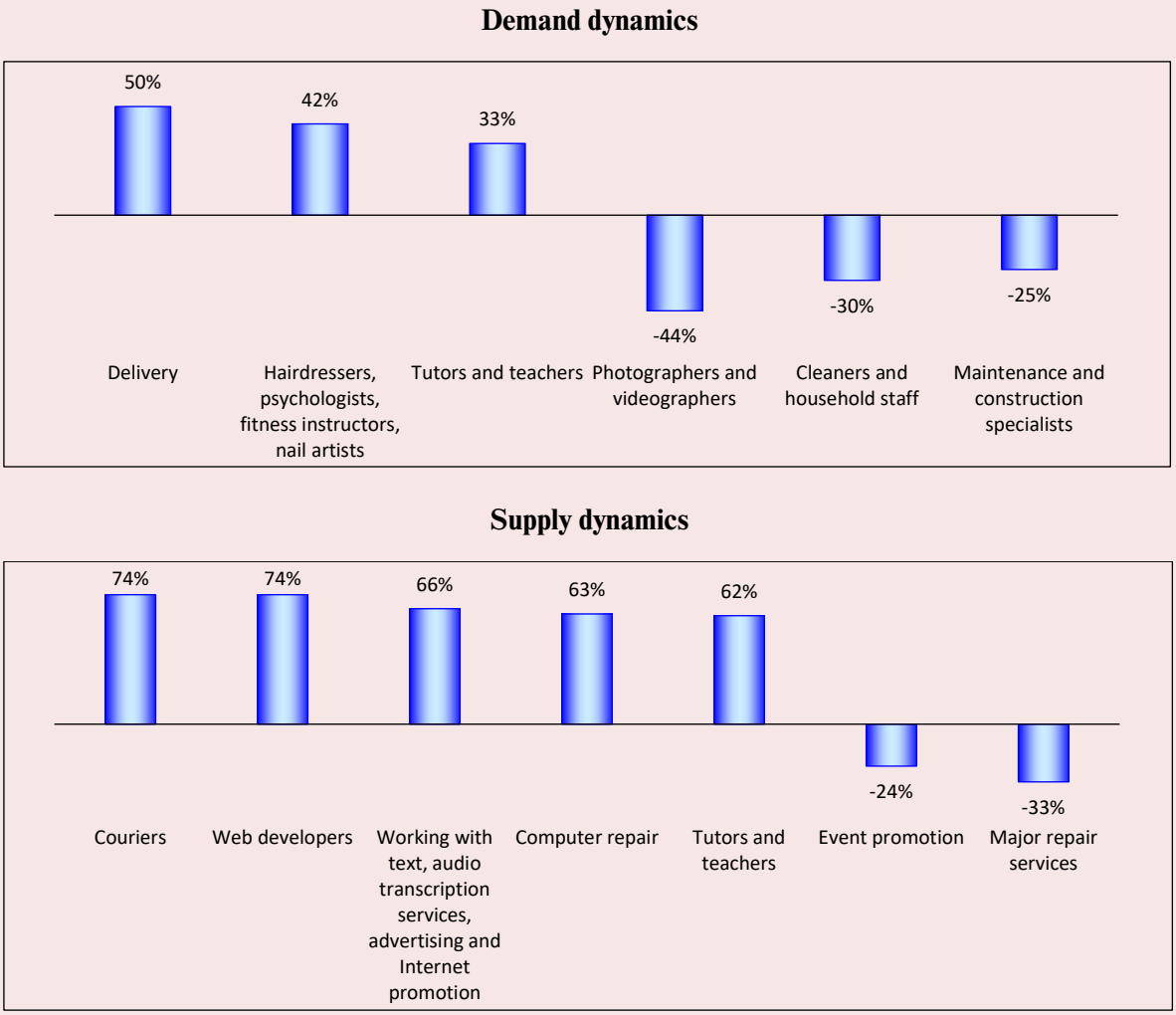
and in finance and insurance. In all the surveyed activities, platform work was mainly a secondary rather than primary source of income *(Fig. 2)*.

On average, half of the overall European platform workers perform both digital and on-location services. This suggests that many workers perform more than one type of task via platform.

Companies from various fields actively cooperate with Russian freelancers [21]. Typical customers are organizations engaged in software development, development, support and promotion of websites, working in the field of design, marketing, PR, advertising; as well as trade and industrial organizations (each of these areas accounts for 10–13% of respondents). For 23% of customers, hiring freelancers is an integral part of the business model, and 19% point out that freelancers play an important role in the organization's activities.

During the COVID-19 pandemic, different sectors of the Russian platform economy are experiencing divergent trends. *Figure 3* shows the dynamics of demand for and supply of services in the areas of platform work.

Figure 3. Dynamics of platform work in Russia during the pandemic (supply and demand), broken down by industry



Source: The most popular professions during the lockdown have been named. Available at: https://www.m24.ru/news/obshchestvo/19052020/118331

According to the COLLEEM survey, for most workers, the conditions of platform work are flexible and safe: platform workers decide for themselves when and how many hours to work and which tasks to perform. Nevertheless, there is a significant proportion of platform workers who consider their work stressful and routine. While all three categories of those working via platform are characterized by similar values in terms of flexibility and security, poor conditions tend to increase as the intensity of platform work increases. More than half of the significant and main platform workers often consider their work stressful and routine, but they are more likely to say that their work via platform is paid fairly.

Respondents who predominantly provided professional services would in general be better paid but also face stressful situations more frequently. Non-professional platform work is associated with more routine tasks and fewer learning opportunities, but also with less stressful situations. On-location platform work tends to give the worker less choice over the tasks to be carried out and less learning, but also a lower level of routine.

Working hours is one of the core dimensions of working conditions (a component of quality of employment). In the COLLEEM survey, platform workers were asked how many hours they work in general and how many specifically on platforms. For all platform workers, the total number of working hours (including platform and non-platform work) is surprisingly small: almost one third of them work less than 10 hours a week, more than 50% work less than 30 hours a week, and only 15% work 40 hours a week. If we look at the hours of work in platforms, the values are even smaller: 42% of platform workers work via platforms less than 10 hours a week, and three quarters – less than 30 hours a week. However, there are significant differences by categories of platform workers: non-significant workers, as a rule, have very short work schedules, the hours of main and very significant platform workers are much closer to those of a regular worker. Almost 24% of platform workers (online and offline) work 40 hours a week, another 24% – between 30 and 39 hours a week, and only 5% work less than 10 hours a week, while 12% of all main platform workers have very long schedules – more than 60 hours a week.

According to [13], many platform workers work atypical hours: 36% regularly worked seven days per week; 43% reported working during the night and 68% reported working during the evening (6 p.m. to 10 p.m.), either in response to task availability (and differences in time zones) or because of other commitments. Many women combined work with childcare responsibilities (one out of five female workers in the sample had small children 0 to 5 years old). Nonetheless, these women spent 20 hours per week on the platform, just five hours fewer than the sample as a whole; many worked during the evenings and at night.

The situation is somewhat different for Russian freelancers[24]: 30.5% work less than 6 hours a day, 28.7% – more than 8 hours a day, and 4.1% – more than 12 hours a day. At the same time, 35.7% work several times a month on Saturdays and Sundays, while only 6.7% have their days off at weekends.

The opinion of Russians about the average number of working hours per week for platform workers (self-employed or freelancers) in comparison with regular employees is roughly consistent with reality[25]: a quarter of respondents believe that the self-employed work more than full-time employees, another quarter of respondents think the amount of working hours in two groups is the same, still another quarter find it difficult to answer (each quarter of respondents make up 28%, respectively). The fact that the self-employed work

[24] The challenges and joys of a typical freelancer in 2020. Available at: https://workspace.ru/blog/the-challenges-and-joys-of-a-typical-freelancer-in-2020/ (accessed: March 15, 2021).

[25] Russians came to love freelancing. Available at: https://wciom.ru/index.php?id=236&uid=10183 (accessed: March 15, 2021).

more is pointed out more likely by men (31%) and by Russians aged 45–59 (32%), as well as by those who have a positive attitude toward freelancers (36%). Representatives of the younger generation aged 18–24 and 25–34 are more likely to believe that the average number of working hours for the self-employed is equal to that for regular employees (41 and 39%, respectively). Only 16% of Russians assume that freelancers work less. This opinion is typical of young people (28%).

The issue concerning the number of hours of platform work in the context of quality of employment has two implications. If platform workers work less than the standard 40 hours a week, because it suits their lifestyle, helps them balance work and family commitments, or because they work so efficiently that they complete tasks faster than their customers expect, this positively characterizes the quality of their employment. If their working hours reduce due to a lack of demand for their work or the inability to find work via platforms, then this indicates the presence of risks related to platform work. The ILO research [14] shows that the demand for such work often exceeds the supply: 89% of the surveyed crowdworkers report that they would like to perform a larger amount of such work than at present, although 44% of them have access to more than one platform; 49% believe that "the amount of work is insufficient", 22% say that the wage is not high enough.

Thus, we can conclude that the *conditions of platform work* are more *polarized* than those of regular workers.

In the U.S., more than two-thirds of platform workers report being satisfied with their work arrangements26. Just like in the EU, they appreciate the control this work allows them over their time and the flexibility of scheduling. Platform work income smooths unstable earnings from a traditional job, helps deal with financial hardships, meet basic needs and pay the bills; some workers use their platform earnings for traveling or other discretionary expenses.

As for the motives or reasons for platform work, the most significant for European workers [13; 20] are flexibility on where and when to work, possibility to balance work and family commitments and being one's own boss, followed by characteristics of the work itself (interesting work, attractive pay). The less frequently mentioned motivations include difficulties associated with finding a regular job, health issues, desire to work part-time. For women, the main reason to work remotely is the need to care for their children. In the ILO survey [13], 10% of respondents indicated health issues (platforms give them the opportunity to continue working and earn income).

For American workers, an important motivation is the low barrier to access digital labor platforms. Some types of platform work are accessible for workers who may otherwise struggle to enter the labor market, including immigrant and formerly incarcerated populations[27].

Half of the surveyed Russian freelancers[28] named the desire to work on a flexible schedule as the main motivation; 35.9% do not want to work in the office, and 30.3% want to have more time for themselves. More than a quarter of the surveyed freelancers (26.8%) are introverts, they are more comfortable working remotely. Other reasons for platform work are related to professional development: 12.5% of respondents are bored with working for the same employer, and 11.9% wanted to achieve professional growth. The main advantages of freelancing, according to the

[26] What are the experiences of gig workers? Available at: https://www.gigeconomydata.org/basics/what-are-experiences-gig-workers (accessed: March 15, 2021).

[27] What are the experiences of gig workers? Available at: https://www.gigeconomydata.org/basics/what-are-experiences-gig-workers (accessed: March 15, 2021).

[28] The challenges and joys of a typical freelancer in 2020. Available at: https://workspace.ru/blog/the-challenges-and-joys-of-a-typical-freelancer-in-2020/ (accessed: March 15, 2021).

freelancers themselves, are the ability to work remotely from anywhere (78.5%) and flexible working hours (74.8%); 44.6% are satisfied with the fact that they work only for themselves and create their own income; 39.3% have more time for themselves and their families thanks to freelancing.

Professional development and career development opportunities are important indicators for assessing the quality of platform work at the current moment and the quality of employment of the individual throughout their working life. One of the signs of platform work, recognized by international organizations and researchers, is the fragmentation of work [8], that is, the division of work processes into specific simple routine tasks (micro-tasks), which, when being performed, make it difficult for workers to improve their skills. Career promotion and professional growth can be achieved only by highly qualified freelancers who provide their services (web development, creative texts and translations, graphic design, accounting and legal advice) via specialized platforms, which often cooperate with international corporations and well-known companies (platform outsourcing). For example, AppJobber lists companies like Nestlé, Sony and Telefonica among its clients. Clickworker has facilitated the provision of various types of labor outsourcing services for Deutsche Telekom, Honda, and Sharewise. The freelancing platforms Upwork, Peopleperhour, 99Designs, iWriter are being used by over five million businesses, including Accenture, AirBnB, and UCLA [7].

Negative aspects of platform work for both European and American workers are as follows: unpredictability of income, which leads to psychological stress and economic issues; lack of access to benefits, including health insurance and pension plans; and insecurity in work relations with customers. ILO survey findings [14] show that workers with more than six months' experience face a substantial amount of rejections: 43% have had at least 5% of their work rejected, and 32% have had at least 10% of their work rejected. A number of platforms have rejection clauses (e.g. AMT, Clickworker, Microworkers) which allow the clients/requesters to reject received work as unsatisfactory with little or no justification.

The main disadvantages of freelancing, according to the freelancers themselves, are unstable income (65.7%), sedentary lifestyle (54.5%), tough competition in the market (41.9%), lack of communication (32.8%), poor self-discipline (30.2%), and frequent overwork (25.8%).

In the course of the interviews, respondents noted such negative aspects as the "invasion" of work in their personal lives and, in fact, the round-the-clock stay on the aggregator's website (responding to customer requests, finding new students, sending reports and reading reviews about their work), the costs of organizing a remote workplace (Internet, computer, and software), social isolation and the lack of even a semblance of a team of labor colleagues.

To assess the quality of this type of employment, we find it important to consider whether the advantages of platform work compensate for its disadvantages. In the framework of expert interviews, respondents (tutors) said that, despite all the difficulties, platform work has become the best solution for combining paid activities, professional development, and fulfilling family obligations. For half of the respondents, platform work was their main job (women with small children, women and men of retirement age), and the other half said it was their additional job (middle-aged people).

According to the European survey [20], there are many more low-income people in the sample of platform workers in comparison with the general population, but the more hours a worker devotes to this activity, the lower the probability of receiving a low income.

A number of studies [13; 14] show that crowd-workers receive low pay by the standards of industrialized countries. Earnings varied depending on

the platform and the country of the worker: CrowdFlower and Microworkers are the lowest-paying platforms (averaging 2 USD per hour). Prolific Academic and Amazon Mechanical Turk (AMT) remain the highest-paying platforms, with workers averaging 4.4 and 3.6 USD per hour, respectively; 75% of U.S. crowdworkers earned less than the federal hourly minimum wage. The low level of pay may be partially attributed to the significant amount of time that workers spend on unpaid work (looking for tasks, taking qualification tests, and researching clients), as well as the small number of hours worked, as we have already mentioned above.

As for Russian freelancers, 72.3% "never run out of money", but only 34.5% are likely to call their income stable. At the same time, the income of 69.9% of freelancers equals or exceeds the average pay in their region, 71.3% of freelancers want to earn more; 71.4% of respondents under 21 years of age and 73.38% of respondents aged over 50 receive up to 40,000 rubles a month, 68.8% of respondents aged from 30 to 40 earn up to 80,000 rubles a month. There is a noticeable difference in the earnings of freelancers without legal status and those registered as individual entrepreneurs: 41.5% of individual entrepreneurs and only 10.3% of freelancers without legal status earn more than 100,000 rubles a month. This indicates a certain degree of *polarization* in the income distribution among different categories of platform workers.

Interesting results are obtained when comparing these data with Russians' opinion about the earnings of freelancers29: 31% of Russians believe that freelancers earn more than regular employees; 26% say their incomes are equal; 12% say that freelancers earn less.

We discussed *social security* of platform workers in more detail in [16]. Since most digital labor platforms classify workers as independent contractors, platform workers are solely responsible for paying social security contributions; moreover, they are excluded from other forms of social protection. According to all the analyzed studies, the social protection coverage of platform workers is very low: according to ILO surveys [13], only six out of ten respondents were covered by health insurance in 2017, and only 35% had a pension plan. In most cases, this coverage stemmed from the respondents' main job or through family members, or was funded by the state as part of universal benefits. About 16% of the workers for whom platform work is the main source of income were covered by a retirement plan, compared to 44% of those for whom platform work was not the main source of income. According to [14], In the case of the 56% of workers who state that crowdworking is their main job, only 55% of these report that they have access to health coverage, and only 24% make contributions to their health insurance. The proportions are even lower with respect to pensions: only 25% of workers have access to a pension scheme, and only 15% make contributions to a pension. Workers from Western Europe have better coverage than those from Eastern Europe, Asia, Africa and Latin America.

Platform workers have very limited opportunities for engaging in *social dialogue30* that guides the participation of workers, employers, and governments in employment decision-making and includes negotiations, consultations, and information exchange among representatives of these groups regarding common interests in socio-economic and labor policies. Many platforms specifically prohibit workers from joining any

[29] Russians came to love freelancing. Available at: https://wciom.ru/index.php?id=236&uid=10183 (accessed: March 15, 2021).

[30] International Labour Conference, 102nd Session, 2013. Report VI: Social dialogue. Recurrent discussion under the ILO Declaration on Social Justice for a Fair Globalization. International Labour Office. Geneva. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_210128.pdf (accessed: March 15, 2021).

trade unions and conducting collective bargaining. Europe takes active steps to address this issue [16]. The solution for Russian workers could be to establish a "digital trade union" [22] in the form of a set of services available to every worker, regardless of the form of employment.

Conclusions

Platform workers are different from regular employees. However, just as there is no "average" traditional worker, we cannot derive a formula for an "average" platform worker. Nevertheless, it is possible to identify signs of the quality of employment of platform workers that affect the stability of employment.

The results of the comparative study suggest that platform workers in Russia and other countries have many similar socio-demographic features. In general, it can be argued that platform workers are younger and more educated. There are more men than women among platform workers. There are significant differences among workers, depending on whether they perform digital or on-location services. The quality of employment of online workers is generally better. Perhaps this is due to the fact that they perform more skilled work that requires a higher level of education and provides an opportunity for professional growth.

The advantages and disadvantages of platform work are distributed unevenly. The work that some workers perform so as to smooth out or supplement their income is a source of high financial instability for others. What brings flexibility and freedom to some (mothers with young children, the disabled, pensioners, schoolchildren and students living in remote areas, etc.), becomes a cause of instability and insecurity for others (taxi drivers, micro-task workers, home staff, construction workers). The needs of a highly qualified freelancer are fundamentally different from those of a full-time employee. Researchers should continue to study features of platform workers to get a better understanding of the range of needs of this group of workers.

The architecture and model of digital labor platforms can involve the exchange of highly substitutable or standardized work or become a channel for exploitation of workers (Uber, CrowdFlower, AMT), while others provide a space for workers to develop more specialized services and build a network of professionals (Toptal, 99Designs, iWriter); as a result, the architecture of the platform has important implications for the workers' autonomy, as well as their working conditions and earnings.

As for the employment status of platform workers, we consider it impractical to introduce a separate category of those "employed on digital labor platforms", since they can be classified either as economically dependent performers and contractors, or as self-employed. In Russian legislation, it is necessary to determine the specifics of the legal status of the self-employed in general, to develop rules for economically dependent performers and contractors (dependent self-employed), and to create provisions that reflect the specifics of employment on digital labor platforms.

The new form of employment we have considered requires new solutions in the field of remuneration, preservation and documentation of workers' experience, professional development and retraining, and protection of their labor rights [16]. From the point of view of social protection, it may be necessary to introduce insurance models that are not based on employment status.

Conducting large-scale nationwide surveys and introducing platform employment indicators in the surveys of the Federal State Statistics Service (Rosstat), Federal Service for Labor and Employment (Rostrud) and other agencies can become important steps in studying the quality of employment of Russian platform workers.

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Social and Psychological Support of Couples in Treating Infertility (Case Study of the Polish Research)

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Abstract. According to the World Health Organization (WHO), nearly 60–80 million couples worldwide struggle with infertility – inability to conceive a child without medical assistance. Infertility is a relevant medical, social, socio-psychological, and demographic problem that negatively affects the demographic situation across the world. In this regard, assisted reproductive technologies help. Infertility diagnosis and treatment is a lengthy and burdensome process, and patients need socio-psychological support while going through it. The purpose of the study is to analyze the situation with the treatment of infertile couples using assisted reproductive technologies in the Republic of Poland and the Russian Federation in the context of the perception of socio-psychological support provided to couples (case study of the Polish research). We used sociological methods: in particular, the author's own questionnaire and R. Schwarzer and U. Schulz's test psychological methodology for assessing a respondent's subjective perception of socio-psychological support. The study involved 39 couples treated for infertility. The majority of respondents (27 couples; 69%) were married. Most female (32 women; 82%) and male (31 men; 79%) respondents did not have children. The results showed that women need more support than men: women received more statistically significant points on the "support-seeking" scale. According to the study, support of a family and a partner were assessed highly. It was revealed that social and psychological support during infertility leads to a positive effect that provides acceptance of the disease (infertility) and reduces stress and a feeling of a loss. Moreover, social and psychological support has a significant impact on the prevention of mental disorders among people treated for infertility. We conclude that socio-psychological support is important for patients diagnosed with this problem.

Key words: infertility, infertility treatment, perception of support, social support.

Introduction. Demographic aspect of the problem

Developed countries are currently experiencing a steady increase in the number of infertile families. The prevalence of infertility in European countries is on average about 14%. In modern realities, this problem is becoming increasingly relevant, and it appears to researchers, most likely, as a demographic problem, rather than a medical-social and socio-psychological one. Its demographic content is that infertility causes a general decline in the birth rate, a decrease in the population in general and the labor force in particular.

The total birth rate in the Republic of Poland is 1.45 (2020), while it was 2.28 at the end of the 20th century (1980). In the European Union, this figure is 1.61. In Russia – 1.489 (2020), which shows a decrease in relation to the previous five years (1.76 – in 2016) and a practical return to its values of the mid-1990s.

Poland and Russia are characterized by a tendency of increasing age of women giving birth (a shift towards the age categories of women – 25–29 and 30–34 years) [1]. Attributing the planning of the first pregnancy to the third or fourth decade of a woman's life is one of the main reasons for the development of impaired fertility and a decrease in the birth rate.

The deterioration of the reproductive characteristics of the population in the 21st century has reached a level that can limit the birth rate in society. According to the World Health Organization, 60–80 million couples in the world are not able to conceive a child without medical care. In Poland, this problem affects 1.2–1.3 million couples [2; 3]. In Russia, from 15–18% (about 4.5–5 million) [1]. A high proportion of childless couples should be considered a "reserve for the birth of desirable children", as well as as an

[1] Ovsepyan N. The basics of extinction: why a number of infertile couples is growing in Russia. Available at: https://www.ridus.ru/news/287438 (accessed: April 15, 2021)

opportunity to "increase the reproductive potential of the population" [2]. This situation is problematic for many industrial states and is among the priorities of national programs. The change of the traditional type of population reproduction to the modern one actualizes the problem of the realization of individual reproductive capabilities [4; p. 69]. It is now coming to the forefront of the demographic policy of many countries. In these conditions, one of the measures that contribute to the growth of fertility is the use of the potential of infertile couples by treating infertility with the help of assisted reproductive technologies (for example, in vitro fertilization – IVF).

The purpose of the study is to analyze the situation with the treatment of infertile couples using assisted reproductive technologies in the Republic of Poland and the Russian Federation in the context of the perception of socio-psychological support provided to couples (using case study of a Polish study).

Socio-psychological and medico-social aspects of the problem of infertility treatment

According to the World Health Organization's (WHO) methodological approach, infertility is the inability to get pregnant after 12 months or more of regular sexual intercourse [5].

Taking into account the time when a woman is unable to become pregnant, infertility is divided into primary and secondary. Primary infertility is defined as the absence of pregnancy or difficulty in conceiving. On the other hand, secondary infertility refers to the situation when a woman is not able to get pregnant after previously giving birth to a child. Another criterion for classifying infertility refers to its causes: female factor infertility, male factor infertility, infertility of both partners, and idiopathic infertility[3] [6; 7].

The causes of infertility include, among others, chronic or "civilization" diseases (for example, oncology), social and cultural changes. Increasingly more women decide to become mothers later, which may also reduce their chances of having children. Other important factors involve: unhealthy lifestyle and habits; e.g, wrong diet, little physical activity, or the inability to handle stress and tensions [7; 8].

Female infertility, which is influenced, among others, by the psycho-neuro-endocrine system, consists in the inability to become pregnant or the inability to carry a pregnancy to term [2]. Taking into account etiology, female infertility can be caused by endocrine (various organic and functional disorders), anatomical, cervical (inflammatory diseases, immunological infertility) factors, and a factor of unknown origin.

Male infertility can be caused by idiopathic (unknown origin), endocrine, infectious factors, as well as obturation and other causes [7]. Male infertility can be divided into congenital and acquired [8; 9].

Overall, WHO identifies 22 factors of female and 16 factors of male infertility. At the same time, there is a combined effect of factors of physical ill-health, social, and psychological distress [10].

Being diagnosed with infertility is an extremely difficult experience for a couple, which may be compared to a crisis or traumatic situation. This situation is the most traumatic for women. In recent years, psychological and medical research has been actively studying the strategies of behaviour of women suffering from infertility. They can be classified as:

1. Experiencing infertility as a critical life situation. The process of experiencing this problem includes four types of critical situations (stress, frustration, conflict, crisis). "For many married couples, infertility is one of the main life crises and a psychologically stressful event" [9]. Infertility stress affects the personal life of each partner, negatively affects the safety of family relationships, increases

[2] Social aspects of infertility. Available at: https://www.uroweb.ru/article/db-article-sotsialnye-aspekty-besplodiya (accessed: April 15, 2021)

[3] Idiopathic infertility is an inability of a couple to conceive a child with unexplained causes of fertility disorders.

feelings of anxiety and guilt, reduces self-esteem and mood in general. American researchers have found that women are characterized by such types of experiences as avoiding conversations about infertility, searching for hidden meanings in this situation, immersion in their own experiences, and the desire to share the burden of this problem with someone [10].

2. Coping with the adverse effects of stress (coping strategies) used by women in experiencing infertility [13]. The basic coping strategies, according to the theory of coping behaviour by R. Lazarus and S. Volkman [14; 15], are: "problem solving", "search for social support", "avoidance"[4].

Due to unsuccessful attempts to have children, more and more couples seek medical help. Treatment of infertility to achieve a pregnancy and give birth to a healthy baby, begins with a careful diagnosis and depends on the cause of infertility which is diagnosed [16]. A healthy lifestyle, proper diet, optimal BMI, quitting smoking, reducing alcohol and caffeine intakes, are also very important in treating infertility. In the case of endocrine problems, it is crucial to balance hormone levels.

The need for assisted reproductive technologies is increasing. There are quite a lot of them in modern medicine: in vitro fertilization (IVF), ICSI (injection of sperm into the cytoplasm of an oocyte (egg), cryopreservation of germ cells, embryos and tissues of reproductive organs, the use of donor embryos, surrogacy, etc. The most effective method of assisted reproduction is in vitro fertilization by IVF with subsequent embryo transfer (ET) [6].

The availability of assisted reproductive technologies is estimated by the number of ART cycles per 1 million people. In contemporary Europe, this figure averages 1,500 IVF cycles per 1 million people (in Denmark – 3,000, in the Czech Republic – 2,500 cycles, etc.), resulting in 3–6% of the total number of pregnancies.

The efficiency of these technologies in 26 European countries is on average 36.5% (in the world, for comparison, 15–20%). At the same time, in Poland – 29%, which is slightly lower than general European statistics[5]. In Russia – 38.5%, according to the report of the RAHR[6] register for 2016.

Social and psychological support in the treatment of infertility

Infertility is becoming an increasingly common and serious problem. This is due to chronic and civilizational diseases, environmental pollution, and sociocultural changes. The inability to have a child is a biological, psychological, and social problem [2]. Many authors emphasize the problem of alienation of infertile people and the consequences: for example, stigmatization, which leads to depression and isolation [2, 17, 18, 19]. Therefore, the inability to have children can lead to a decrease in self-esteem, a sense of loss, a lack of acceptance, and a sense of meaninglessness, to a deterioration in relations between partners and other people. All this, in turn, increases the level of anxiety, depression and stress. The research notes that women and men react differently to news about their infertility and treat treatment differently. Common to women and men is increased anxiety and a tendency to depression, as well as low self-esteem. Moreover, such patients tend to experience a loss of their identity; they feel that they are not able to live normally and build relationships [20].

That is why couples who are being treated for infertility should be considered people experiencing a crisis, and those who need serious support and professional help [21; 22]. Infertility treatment is a complex, long, and complex process in which couples experience strong emotions. Studies

[4] *Encyklopedia Zdrowia*. PWN, Warszawa, 2011.

[5] Unmet demand. *Kommersant.* Healthcare: a thematic supplement to the newspaper „Kommersant" no. 189, October 16, 2018, p. 16. Available at: file:///C:/Users/gwl/AppData/Local/Temp/KOM_189_161018.PDF (accessed: March 28, 2021).

[6] RAHR – Russian Association of Human Reproduction.

conducted by various authors show that social support plays an important role in the prevention of post-traumatic stress disorder and the consequences of chronic stress that patients with infertility may experience [23].

Communication between partners and their willingness to understand each other are extremely important in infertility treatment. High perceived support and mutual understanding increase their satisfaction with the relationship and positively influence the process of trying to achieve a pregnancy. Social and emotional support are key aspects. They reduce stress and anxiety, which can negatively affect fertility or the maintenance of pregnancy.

In addition to diagnostic and therapeutic measures, the support provided by the medical staff is extremely important. The mental state of both partners can greatly affect the effectiveness, duration, and prospects of treatment. Therefore, the role and scope of medical support is extremely important [23].

In the literature, it is often noted that infertility is not perceived as a disease, but as the absence of a desired condition. Therefore, infertility has a social side, and it becomes a stressful situation for those who are faced with the problem. Thanks to the support provided, infertile couples can feel sympathy and understanding from their relatives and receive professional help from specialists [23].

Social support is a multidimensional concept, hence the attempts that are made to define it, are often based on particular elements that constitute social support. In practical terms, support is usually understood as help to another person in a difficult, stressful or critical situation from other people (relatives, acquaintances, friends), society (employees of organizations (for example, medical), the working collective (work colleagues), etc., social enterprises (foundations, trade unions, NPOs, etc.). Social support involves material, informational, or emotional help [24; 26].

Psychological assistance is provided within the framework of reproductive psychology, one of the areas of which is the problems associated with the use of assisted reproductive technologies[7].

Emotional support is the most commonly identified type of support. It involves showing empathy, understanding, maintaining and maintaining calm, or expressing concern, and depends on the nature of the relationship between the individual and an environment [27; 28].

Another type of support is informational (cognitive), which helps a person experiencing a difficult situation to understand it. It includes providing information or recommendations that can help solve the problem, as well as information about how, where and to who to turn for help [28].

The material type of support consists in the possibility of implementing the IVF procedure within the framework of the HE (for example, in Russia such a measure has been in effect since 2013).

The efficiency of psychological care for women and couples with difficulties with conception is confirmed by many scientific studies in the world. The importance of this problem is also supported at the supranational level. For example, the European Society for Human Reproduction and Embryology (ESHRE) has a Section on Psychology and Counselling, the main purpose of which is to increase the knowledge of specialists about the needs of patients in psychological care and to solve their psychosocial problems. A number of European countries have implemented a whole system of psychological support for patients in IVF programs. Some of this care, for example in the UK, is included in the standard of treatment, which significantly improves the results.

[7] Fillipova G.G. Reproductive psychology: psychological assistance to infertile couples using assisted reproductive technologies. *Clinical and Medical Psychology: Research, Training, Practice: El. Ac. Jou.,* 2014, no.3 (5), p. 6. Available at: http://medpsy.ru/climp (accessed: March: 31, 2021).

The researchers note that in Russia, until recently, a predominantly medical approach to the treatment of infertility prevailed[8]. However, today almost all reproductive clinics employ psychologists. The effectiveness of psychological support is evidenced by Russian studies [29]. During the examination of more than 350 Russian women who applied to the National Medical Research Center of Obstetrics, Gynaecology, and Perinatology named after Ac. V. I. Kulakov, it was revealed that during psycho-correction among patients, emotional experiences are reduced and the results of treatment are significantly improved. Thus, in the group of women who attended classes with psychologists, the frequency of pregnancy was higher than in the control group: 39% vs. 26%, respectively. That is, competent psycho-correction work allows not only achieving improvements in the emotional sphere of patients, but also increasing the frequency of pregnancy.

Similar results were obtained in a Polish study conducted by Malina A. and Suvalskaya-Barantsevich D. [30] in a group of 98 respondents with infertility problems. It showed that the higher the level of perceived social support, the higher the statistically significant indicator in the mental well-being of respondents from its various aspects (self-acceptance, personal development, life goal, autonomy, control over the environment and positive relationships with other people). This study further revealed the dependence of the mental well-being of respondents undergoing infertility treatment on emotional support: the higher the level of support, the higher the psychological state is.

The importance of support for the well-being of pregnant women from the high-risk group is noted in a similar survey by Polish scientists Koss J., Rudnik A., Bidzan M. [31].

[8] Solov'eva E.V. On the effectiveness of psychological care in the treatment of infertility (research review). Available at: www.psymama.ru/biblioteka/stati/drugoe/ob-effektivnosti-psihologicheskoj-pomoshhi-pri-lechenii-besplodiya-obzor-issledovanij/ (accessed: April 15, 2021).

Materials and Methods

The authors formulated the following research hypotheses for assessing social support:

H.1. The couples treated for infertility, value support from their family and partner high, and they feel this support.

H.2. The level of support received from medical staff has an important influence on how support is perceived.

H.3. Women have a greater need for support than men.

H.4. Couples differ in terms of how much they are involved in support-seeking.

We used the following research tools in the study:

1) the individual questionnaire and survey questionnaire developed by the authors;

2) the *Berlin Social Support Scales (BSSS)* developed by Ralf Schwarzer and Ute Schulz [26].

The study was conducted among couples treated for infertility. Online diagnostic tests were carried out on the internet forums which support infertile couples. The respondents were informed how to complete the tests, and that these were anonymous and would be used for research purposes only. By submitting a questionnaire, they consented to take part in the study. 39 couples of childbearing age participated in the study. The respondents were divided into 4 groups based on their age. This is shown in *Table 1* below.

The majority of female respondents (41.03%) were under the age of 30, followed by those aged 30–35 – 14 women (35.90%). Five women (i.e., 12.82%) were aged 36-40, and four (10.26%) were over 40 years old.

In the group of male respondents, the majority (17 respondents, which constitutes 43.59%) were aged 30–35, followed by those under 30 (11 respondents; 28.21%). Five males were over 40 (i.e., 12.38%), and six (15.38%) were aged 36-40.

Table 1. Age of respondents (in years)

Age	Females		Males	
	Number	%	Number	%
< 30 years	16	41.03	11	28.21
30–35	14	35.90	17	43.59
36–40	5	12.82	5	12.38
> 40 years	4	10.26	6	15.38
Total	39	100	39	100
Source: hereinafter: data of a study conducted in the Republic of Poland (no. = 78 people).				

Table 2. The presence of children before the start of infertility treatment

Previous children	Females		Males	
	Number	%	Number	%
Yes	7	17.95	8	20.51
No	32	82.05	31	79.49
Total	39	100	39	100

Most couples participating in the study were married – 27 (i.e., 69.23%). 12 individuals (30.77%) were in a partner relationship.

Table 2 shows data on the presence of children before the start of infertility treatment. The data obtained show that the majority of female (82%) and male (79%) respondents did not have children before the start of infertility treatment. About a fifth of women (18%) and men (21%) have already had children before they decided to undergo infertility treatment.

Results

Based on the results, it can be concluded that most couples (62% – 24 couples) in the study group suffered from infertility from 1 to 5 years. One third of respondents (28%) suffered from infertility for over 5 years. The shortest duration of infertility (less than 6 months) was reported by 4 couples (10%). No studied couples indicated the duration period of between 6 months and 1 year *(Tab. 3)*.

Another important aspect of the analysis is to determine the cause of infertility *(Tab. 4)*.The results of the survey of married couples indicate that the majority of respondents have idiopathic infertility as a cause (31%). It should be noted that in modern society, in conditions of high stress factors, poor ecology, the problem of idiopathic infertility, that is, infertility of unclear etiology, is

Table 3. Duration of infertility in the study group

Duration of infertility	Number	%
Up to 6 months	4	10.26
From 6 months to 1 year	0	0.00
From 1 to 5 years	24	61.54
Over 5 years	11	28.21
Total	39	100

Table 4. Diagnosis of married couples in the study group

Cause of infertility	Number	%
Male factor infertility	10	25.64
Female factor infertility	11	28.21
Infertility of both partners	6	15.38
Idiopathic infertility	12	30.77
Total	39	100

very relevant. It is diagnosed when a couple passes a full examination and it is impossible to determine the causes of the problem.

On the second position, according to the survey results, female infertility (28%) and, next, male infertility (26%). A smaller proportion of the couples who took part in the study (15%) were treated for infertility of both partners.

As mentioned earlier, infertility treatment is a long process, lasting from several months to more than a decade (for example, on average, 0.5–15 years for women and 0.5–12 years for men) [26]. *Table 5* shows the data on the duration of infertility treatment in the examined couples.

The research demonstrates that 18 couples in the study group were treated for infertility from 1 to 5 years (46%). The shortest duration of infertility treatment (up to 6 months) concerned 12 couples (31%). Eight couples (21%) were treated for infertility for the period of between 6 months and 1 year). The longest period of infertility treatment (over 5 years), was indicated by one couple (3%).

For the treatment of infertility, the majority of couples (56%) in the study group resorted to such assisted reproductive technology as IVF-ICSI (in vitro fertilization). In other cases (44%), another technology was used – intrauterine insemination.

Based on the results of the study, it can be stated that 62% of female and 64% of male respondents are convinced that in vitro fertilization is an innovative and effective method of infertility treatment *(Tab. 6)*. About a third of women and the same number of men (that is, 33% in each group) believe that in vitro fertilization is effective, but controversial. Only two women (5%) and one man (3%) recognize in vitro fertilization as an innovative method that contradicts their beliefs.

The study shows *(Tab. 7)* that more than a third of respondents highly assesses the support of the family in the treatment of infertility (31% of women

Table 5. Duration of infertility treatment

Duration of treatment	Number	%
Up to 6 months	12	30.77
From 6 months to 1 year	8	20.51
From 1 to 5 years	18	46.15
Over 5 years	1	2.56
Total	39	100

Table 6. Attitude to in vitro fertilization in the study group

Opinions about IVF	Females		Males	
	Number	%	Number	%
It is a novel and effective method of infertility treatment	24	61.54	25	64.10
It is an effective but controversial method of infertility treatment	13	33.33	13	33.33
It is a novel method, but it is against my beliefs	2	5.13	1	2.56
Total	39	100	39	100

Table 7. Perception of family support in the study group

Support level	Females		Males	
	Number	%	Number	%
1 – none	3	7.69	1	2.56
2 – low	7	17.95	2	5.13
3 – average	10	25.64	16	41.03
4 – good	7	17.95	9	23.08
5 – very good	12	30.77	11	28.21
Total	39	100	39	100

and 28% of men gave a rating of 5 points out of 5 possible). Another 16 people (7 women and 9 men) rated it with four points (18 and 23%, respectively). The combined assessment of positive perception is 49% for the female half of the respondents and 51% for the male half.

The average level of support was noted by 26% of women and 41%of men, and low scores were given by 18% of women and 5% of men. At the same time, 8% of women and 3% of men said that they do not receive any support from the family.

Comparing the level of perception of family support in the male and female groups, we can conclude that the majority of women (31%) note a very high level of support from the family (5 points), while in the male group, 41% of respondents perceive it as average (3 points). This indicates the gender characteristics of the perception of support and gives reason to judge that men, experiencing emotions, as a rule, try to contain them, coping with the problem on their own.

Based on these results, it can be argued that support is very important for every partner experiencing a difficult situation of infertility treatment. Insufficient or weak support can increase stress levels, feelings of insecurity, and feelings of ineffective treatment *(Tab. 8)*.

The results showed that the majority of respondents (56% among women and 51% among men) stated a very good level of support from their partner (5 points). Seven women (18%) and 13 men (33%) describe their partner's level of support as good (4 points). Only five women (13%) and six men (15%) claimed that their partner's support was average (3 points), while five women (13%) rated their partner's level of support in the infertility treatment process as low (2 points).

The level and quality of support received from a partner, who is the closest person, is extremely important, especially in case of infertility treatment. It gives a sense of security and confidence, thereby strengthening the ability to cope with treatment-related stress. Lack of support or low support increase the feeling of stress and helplessness.

The analysis conducted, based on the results shown in *Table 9*, relates to the subjective perception of the support received from the medical staff. The majority of respondents rated the level of support of

Table 8. Perception of support received from a partner in the study group

Support level	Females		Males	
	Number	%	Number	%
1 – none	0	0.00	0	0.00
2 – low	5	12.82	0	0.00
3 – average	5	12.82	6	15.38
4 – good	7	17.95	13	33.33
5 – very good	22	56.41	20	51.28
Total	39	100	39	100

Table 9. Perception of support received from medical personnel in the study group

Support level	Females		Males	
	Number	%	Number	%
1 – none	4	10.26	0	0.00
2 – low	0	0.00	2	5.13
3 – average	12	30.77	9	23.08
4 – good	12	30.77	13	33.33
5 – very good	11	28.21	15	38.46
Total	39	100	39	100

medical personnel as very good (5 points) and high (4 points). 11 women (28%) and 15 men (38%) in the study group rated the level of this support as very good, while 12 women (31%) and 13 men (33%) rated it as good. Care and support from medical staff was rated as average by 12 women (31%) and nine men (23%). Two men (5%) rated the level of support from medical staff low, while four women (10%) said they received no support.

The majority of couples who took part in the study, notice and appreciate support they receive both from their family, partner and medical staff. However, there are some individuals who do not notice this support or minimise its scope. This is quite common especially in difficult and stressful situations, such as infertility treatment. Individuals may not notice the support they receive, expect too much support, or they may not appreciate it. Having trust in medical staff and medical procedures that are used in infertility treatment, enables the patients to accept their situation and increases their belief that they are strong enough to cope with it [31]. Nurses, midwives and doctors who take care of couples treated for infertility, should pay attention to the quality of assistance and support they provide, as this influences a patient's sense of security and treatment [25].

Most respondents assessed support received from medical staff as very good (5 points) and good (4 points). 11 women (i.e., 28.21%) and 15 men (i.e., 38.46%) in the study group, perceived support from medical staff as very good; whereas 12 women (30.77%) and 13 men (33.33%) stated that it was good. Assistance and support from medical staff were viewed as average by 12 women (i.e., 30.77%) and 9 men (i.e., 23.08%). Few respondents: 2 men (i.e., 5.13%) assessed medical staff support as low and 4 women (i.e., 10.26%) felt that they had received no support.

The findings *(Tab. 10)* concerning the need for support show that the mean value in the group of male respondents was 10.93 (min = 7, max=14), while it was 12.43 for female respondents (min = 7, max = 14). This result indicates that women display a higher need for support in a difficult life situation, which confirms the proposed hypothesis.

Table 11 below complements the results given, as it indicates significance of results for the need for support among respondents depending on their gender. Statistical analyses indicate that female respondents showed a significantly higher need for support both from the family, partner, and medical staff during infertility treatment, as compared to their male partners (p = 0.001).

Table 10. Need for support among women and men who undergo infertility treatment

Variable	T-test for dependent samples (Worksheet 83) Marked differences are significant when p < 0.05000				
	Mean Value	Standard deviation	Significant deviation	Difference	Standard deviation difference
Need for support among men	10.92308	2.144572			
Need for support among women	12.43590	2.149601	39	-1.51282	2.683986
Source: own calculations.					

Table 11. Need for support among men and women, statistical significance

Variable	T-test for dependent samples (Worksheet 83) Marked differences are significant when p < 0.05000				
	t	df	p	Confidence -95.000%	Confidence + 95.000%
Need for support in men & need for support in women	-3.51997	38	0.001139 **	-2.38287	-0.642773
Source: own calculations.					

Table 12. Support-seeking during infertility treatment among women and men

Pair of variables	Wilcoxon signed-rank test (Worksheet 83) Marked results are significant when p < 0.05000			
	N Significance	T	Z	P
Support-seeking among men and support-seeking among women	32	149.5000	2.141029	0.032272 *
Source: own calculations.				

Table 12 presents the results concerning support-seeking during infertility treatment in the study group.

Statistical analyses indicate that female respondents were more likely to be involved in support-seeking both from the family, partner, and from medical staff, as compared to their partners (p = 0.03).

Discussion and Conclusions

The laws of demography say that every case of infertility is a loss of potential births, confirming that this is a problem not only for a family, but for society [33]. Therefore, investments in assisted reproductive technologies (ART) are becoming one of the ways of improving the demographic situation in countries.

Research findings have shown that couples treated for infertility, rank support from their family and partner high, and that they experience this support.

It can also be concluded that the level of support received from medical personnel significantly affects the perception of this support.

In a difficult situation such as infertility treatment, female respondents show statistically significantly higher need for support (p = 0.001) than male respondents. This is also confirmed in the literature, which points out that women are more likely to benefit from social support than men. It is also connected with the fact that women are more likely to notice this support.

Our findings indicate that the couples have different degrees of involvement in social support seeking. Female respondents are significantly more likely to get involved in support-seeking (p = 0.03) than their male partners. The analysis of research and literature shows, for example, that support-seeking is lower among couples treated for infertility (M=13.96) than among cancer patients (M=15.34) [23]. This may be caused by the fact that women feel more responsible than their partners for solving infertility problem. On the other hand, it is women that often attract more attention from those who provide support. Moreover, it is women that are more often studied by those who conduct research on the needs of couples treated for infertility [19; 24; 25]. Reproductive health is the most important component of the health of society as a whole [34], and timely identification and prompt resolution of existing problems in this area is required.

To sum up, it should be pointed out that social support has a significant impact on preventing mental disorders among people treated for infertility. It enables infertile couples to accept and reconcile with the diagnosis, which in turn facilitates infertility treatment. Therefore, it is extremely important that patients treated for infertility are provided with social support, and medical personnel establishes therapeutic contact with them [17].

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REVIEWS

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Mental Health of Population in the COVID-19 Pandemic: Trends, Consequences, Factors, and Risk Groups

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Abstract. The purpose of the study is to analyze the mental health losses of population during the COVID-19 pandemic. Based on the systematization of foreign and Russian studies regarding the pandemic impact on mental health, two major burdens (neuro-psychiatric and psycho-emotional) and three levels of ill health manifestations (physiological, mental, and behavioral disorders) were revealed. We used the method of analyzing articles from international electronic databases on the topic of mental health loss due to the new coronavirus pandemic and other epidemics. The scientific novelty of the study consists of the identification of psycho-emotional and psycho-neurological burden of the pandemic, determination of a three-level structure of mental ill health manifestations, and a comprehensive approach to the analysis of losses (includes the characterization of emerging mental health disorders, risk factors and groups, as well as the search for its prevention areas). We achieved the following results: neuropsychiatric burden is manifested in damages to the central and peripheral nervous system, neuropsychiatric and cerebrovascular complications, and changes of mental status due to the neurotoxic effects of the SARS CoV-2 virus. The psycho-emotional burden of the COVID-19 pandemic reveals itself physiologically – in somatic reactions to a stressful situation. At the mental level, there is a debut or relapse of panic, anxiety, depressive disorders, adaptation disorders, and symptoms of post-traumatic stress disorder. The behavioral level is associated with an increase in cases of domestic violence, various addictions, suicidal and protective behavior, changes of food habits, etc. The authors conclude that most negative consequences

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are preventable. The practical significance of the research is to prepare a list of mental health disorders during the pandemic, groups, and risk factors for its loss. Findings about groups and risk factors will allow substantiating the structure of further sociological research. The results obtained (including a list of ways of reducing the burden) can be used by authorities in the development of programs to strengthen population's mental health, including high-risk groups. Their implementation will reduce the burden on the medical network, improve population's quality of life, preserve the labor potential and social stability of society necessary for the post-pandemic economic recovery, and prevent the psycho-emotional burden of future epidemics. Research perspectives are cross-country comparison of the psycho-emotional burden of the pandemic and its dependence on the anti-epidemic policies implemented by governments (introduction of strict self-isolation measures, lockdown, media activities, mandatory testing, etc.).

Key words: COVID-19 pandemic, mental health, psychoemotional burden, mental disorders, neuropsychiatric disorders, suicide, depression, anxiety, domestic violence, infodemic.

Introduction

2020 was a year devoted to the fight against the new coronavirus infection. Attempts to limit the SARS CoV-2 spread led to the introduction of severe restrictions on movement and social distance measures. Ultimately, the COVIND-19 pandemic seriously damaged human health, the healthcare system, and the economy.

Several scientists call a lockdown, which was introduced in many countries, a largest psychological [1, p. 46] (or psychosocial [2]) experiment, and they are only beginning to analyze its results.

Unclear, invisible threat of a previously unknown virus, combined with an inability to take clear active actions, increases fear and anxiety, can provoke the onset or relapse of anxiety, depressive, obsessive-compulsive, and other mental disorders, pathological addictions and suicide. Some authors even mention the risk of mass psychosis. The mechanisms of imitativeness and suggestibility, which are usually necessary for efficient regulation of social behavior, contribute to the triggering of psychoses while experiencing fear and distress in a large group [3]. RANS Academician, Dr. Sci. (Med.) I. Gundarov calls the current situation "social schizoid psychosis" in his numerous speeches in mass media. N. Solov'ova, speaking about mental disorders provoked by the pandemic, introduces the "coronavirus syndrome" term, which will affect up to 10% of population involved in the pandemic. In her opinion, the situation and its consequences are similar to those observed in Russia during the perestroika, since the causes of mental disorders are not specific traumas localized in time, but long-term neurotic experiences that go beyond ordinary experience, changes of social ties and life plans, instability and uncertainty of the future, as well as a large amount of unconstructive disturbing information in the media [4].

We need to learn more about the impact of COVID-19 on population's mental health to successfully counter current and future pandemics.

The purpose of the study is to analyze population's mental health losses due to the impact of the SARS CoV-2 virus and measures, taken to combat it, and to find ways to decrease them.

Research objectives:

1) consider the main components of psycho-emotional and neuropsychiatric burden of the COVID-19 pandemic;

2) identify predictors of negative psychological outcomes in the outbreak of a new coronavirus infection and the most vulnerable groups of people;

3) identify ways to reduce population's mental health losses due to the COVID-19 pandemic.

The object of the research is foreign and Russian scientific studies on mental health of population during epidemics and emergencies. **The subject** is human mental health during the COVID-19 pandemic.

Research methodology

The information was collected in the electronic databases PubMed, Elibrary, and Ciberleninka using the search terms "COVID-19", "mental health", "mental disorders", "neurology", "suicide", "depression", "anxiety", "stress", "risk factor" in English and Russian in different combinations. In total, more than four thousand foreign and more than a thousand Russian-language links were received. Most of them are theoretical explorations of various aspects of the studied problem. At the time of writing (late December 2020), the databases contained the results of 647 cross-sectional and two longitudinal studies on the negative impact of the COVID-19 pandemic, various epidemics, and emergencies on public mental health. To prepare the review, we studied 165 articles (in English, Chinese, Italian, German, French, and Indian).

Overall, we considered 74 studies on the impact of the pandemic on covid-positive patients (in the Russian Federation at the time of the review – only a few [5]), mentally ill people, medical professionals, students and other groups, as well as general population. 18 of them reflected case-control compared to the norm, while the rest had no control groups. Two retrospective studies were based on the analysis of several million electronic medical records.

Some results of these surveys are heterogeneous due to differences in locationsб timing, and the methods used (mostly anonymous online surveys, patients' self-reports). The collection of data on the psychoemotional state was conducted using the following methods: A.S. Zigmond and R.P. Snaith's The Hospital Anxiety and Depression Scale (HADS), General Anxiety Disorder Scale (GAD-7), Zung Self-Rating Depression Scale (SDS) and Anxiety Scale (SAS), Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI), Depression Anxiety Stress Scale (DASS21), Perceived Stress Scale (PSS), Stress Reaction Questionnaire (SRQ), Stanford Acute Stress Reaction Questionnaire (SASR), Patient Health Questionnaire (PHQ-9 and PHQ-4), Impact of Event Scale – Revised (IES-R), Pittsburgh Sleep Quality Index (PSQI), Insomnia Severity Index (ISI), Social Support Rating Scale (SSRS), Symptom Check List (SCL-90-R). Most surveys are cross-sectional, and their results are preliminary, which means that they are supported by well-developed longitudinal studies [6]. Nevertheless, they deserve attention since they allow assessing the risks of the virus and the countermeasures for population's mental health.

We relied on the fact that the emergence of COVID-19 is similar to the outbreaks of closely related coronaviruses of 2003 acute respiratory syndrome (SARS or "atypical pneumonia") and 2012 Middle East respiratory syndrome (MERS). According to most scientists, we should expect similar emotional and behavioral reactions among population. We also analyzed articles reflecting psycho-emotional outcomes of other epidemics (Ebola, Spanish flu, swine flu, etc.) and emergency situations (natural disasters and terrorist attacks).

The main advantage of some prominent foreign journals, such as The Lancet Psychiatry, is the speed of the latest studies publishing (first online and then in print), which allows the whole world to timely learn its results that have not lost its relevance in a constantly changing pandemic. In this regard, a major part of the presented review includes foreign information sources.

The scientific novelty of the work is the author's understanding of the psycho-emotional burden of the pandemic and its structure, based on three levels of reactions/changes (physiological, mental, and

behavioral); generalization and structuring of foreign and domestic experience of studying a group of coronaviruses from the point of view of their psycho-neurological and psycho-emotional burden; a comprehensive approach to the analysis of the issue – a study of negative consequences (of the SARS CoV-2 virus and its containment measures), risk factors and groups, and areas for strengthening mental health.

The practical significance of the work is a list of violations of public mental health during the pandemic, groups, and risk factors for its loss. The conclusions will allow justifying the structure of further sociological research of this problem.

The results obtained (including a list of ways to reduce the burden) can be used by authorities for developing programs to promote health among population, including ones for high-risk groups (medical staff, citizens who have been ill with COVID-19, people with chronic diseases). The implementation of these programs will help to reduce the burden on the medical network, reduce several cases and duration of temporary and permanent disability, preserve the labor potential needed in the subsequent period of economic recovery and social stability in society. Everything aforementioned will lead to the reduction of the disease burden. Conclusions about groups and risk factors will allow justifying the structure of further sociological studies on this problem, planned by the Vologda Research Center of RAS for 2021.

Results of the research

Considering studies on various negative effects of a new coronavirus infection outbreak on population's mental health, we can divide the pandemic burden into two types: psycho-emotional and psycho-neurological. Neuropsychiatric burden of the COVID-19 pandemic implies the damage of the central nervous system caused by the neurotoxic SARS-CoV-2 virus. Psycho-emotional burden means psycho-emotional disorders caused by the virus itself and/or measures to contain it. Considering the fact that the psycho-emotional state is a set of changes occurring in a body and mind, including behavioral reactions to a situation, we will study manifestations of mental disorders at three levels: physiological, mental, and behavioral. Let us take a look at them in more detail.

The first level – physiological. This section includes not only "classic" bodily reactions to a stressful situation (increased heart rate, increased blood pressure, increased blood sugar, impaired appetite, sleep disorders, headache, body aches, endocrine disorders, etc.), but also psycho-neurological disorders that emerged due to the impact of the SARS CoV-2 virus, because they manifest themselves at the level of physiology and affect mental well-being.

It has long been known that an infection not associated with the central nervous system (CNS) can cause neuropsychiatric signs. The Spanish flu epidemic of 1918–1919 provoked a sharp increase in the incidence of post-encephalitic parkinsonism [7]. Coronaviruses, closely related to COVID-19, are biologically neurotropic, clinically neurotoxic, and they cause neurological disorders [8–10]. The new coronavirus infection, in addition to changes in lungs, leads to various lesions of all body systems[1] [11]: thrombotic complications, myocardial dysfunction (cardiomyopathy) and arrhythmia, acute coronary syndromes, acute kidney damage, gastrointestinal symptoms, hyperglycemia, ketosis, vasculitis, eye and skin damage, and neurological disorders.

However, a consequence of COVID-19 is of particular importance – cerebrovascular complications, i.e. acute disorders of cerebral circulation (strokes). They are observed during some acute

[1] Meeting the psychological needs of people recovering from severe coronavirus (Covid-19). *Official website of the British Psychological Society*. Available at: https://www.bps.org.uk/sites/www.bps.org.uk/files/Policy/Policy%20-%20Files/Meeting%20the%20psychological%20needs%20of%20people%20recovering%20from%20severe%20coronavirus.pdf (accessed: January 21, 2021).

severe viral diseases (for example, influenza [12; 13]). The main predictors of their development are arterial hypertension, diabetes mellitus, coronary heart disease, and diseases of the respiratory system [14; 15].

Another cause of brain damage during COVID-19 may be encephalopathy of various etiologies, which is also natural for viral infections [16; 17]. Cytokine storm is considered a mechanism of encephalopathy development in coronavirus [18; 19].

Several authors note a possible link between human coronaviruses and the development of multiple sclerosis [20; 21].

CNS lesions more often occur in the group of "severe" patients. Thus, according to a retrospective study in Wuhan, 36% of hospitalized patients had symptoms of CNS disorders, in the "severe" group – 45% [22]. Rogers found evidence of delirium (65%) and agitation (69%) among ICU patients. Every fifth resuscitation patient was diagnosed with altered consciousness (all of them subsequently died) [23].

A study, conducted by a group of scientists led by Varatharaj, of "severe" hospitalized Covid-positive patients in the UK revealed that 62% of them had a violation of cerebral circulation (mostly ischemic stroke – 3/4 of cases). A third of hospitalized patients had an altered mental status (23% of them – unspecified encephalopathy, 18% – encephalitis, remaining 59% – neuropsychiatric disorders). The vast majority of the latter (92%) were diagnosed for the first time (psychosis, neurocognitive syndrome, affective disorder) [24].

Moreover, SARs-CoV-2 virus can lead to lesions of the peripheral nervous system (twice as common in the mild course of the disease [15]). These include damages of olfactory nerves, which were also observed in the exposure to the related coronavirus SARS-CoV-1 [25].

Moreover, according to most researchers, loss of the sense of smell may be an only clinical manifestation of COVID-19[2] [26]. Data on taste changes [15] and oculomotor nerve damage among Covid-positive patients [27] are also interesting.

Patients who were experiencing Covid for two months or more have persisting physiological symptoms: weakness (53.1%), shortness of breath (43.2%), joint pain, muscle pain (27.3%), chest pain (21.7%), as well as cough, loss of smell, dry eyes and oral mucosa, runny nose, red eyes, taste disorders, headache, sweating, loss of appetite, sore throat, dizziness, diarrhea [28].

Thus, acute neuropsychiatric reactions of a body to the neurotoxic COVID-19 virus often lead to severe complications (post-Covid strokes, heart attacks, encephalopathy, etc.), somatogenic mental and neurotic disorders, disability and even death of a patient. Therefore, they reflect and expand the spectrum of the disease burden.

The second level – mental. The spread of the new coronavirus infection and the measures to contain it contribute to the emergence of anxiety and depressive disorders (panic disorder, generalized anxiety disorder, phobias, panic attacks), which constitute the group of the most common comorbidities in various epidemics and emergency situations [29].

Forced isolation has an extremely negative impact on people's mental well-being. Currently, there is more and more data on the increase in symptoms of distress during and after quarantine. Thus, S. Wang and colleagues revealed that 53.8% of people in forced isolation believe that their psychological state has seriously deteriorated [30].

Overall prevalence of anxiety symptoms among Chinese population during the pandemic, according to the results of a longitudinal study, was 35% (5% in 2019), depressive symptoms – 20% (3.6% in 2019), sleep disorders – 18% [31; 32].

[2] Loss of sense of smell as marker of COVID-19 infection. *Official website of the ENT UK.* Available at: https://www.entuk.org/sites/default/files/files/Loss of sense of smell as marker of COVID.pdf (accessed: January 29, 2021).

In the United States, there was the increase in a number of prescriptions for anxiolytic (anxiety-reducing) drugs (by 34%), antidepressants (by 19%), and sleeping pills (by 15%) in the first month of the pandemic[3].

In Italy, after a three-week lockdown, the population showed symptoms of post-traumatic stress disorder (PTSD; 37%), severe stress (22.8%), adaptation disorder (21.8%), anxiety (20.8%), depression (17.3%), and insomnia (7.3%) [28].

Every second resident of Britain and America experienced a significant level of anxiety at the end of March 2020[4].

The resulting mental disorders may be prolonged. Thus, every tenth person who was in the center of the SARS epidemic in 2003 met the diagnostic criteria for PTSD a year later [33; 34].

Based on a systematic analysis of the literature, it can be noted that, among population in China, the United Kingdom, the United States, Spain, Italy, India, Denmark, Turkey, Iran, and Nepal, relatively high rates of symptoms of anxiety (from 6 to 51%), depression (from 15 to 48%), post-traumatic stress disorder (from 7 to 54%), psychological distress (from 34 to 38%), and stress (from 8 to 82%) were recorded during the fight against the pandemic [35].

In Russia, several cross-sectional studies were conducted in 2020 to assess the psycho-emotional state of population. According to the results of one of them, clinical values of anxiety and depression were found among 9.3 and 6.1% of respondents, subclinical – in 12.6 and 15.1%, respectively [36].

According to the results of the study of the staff of the Scientific Center for Mental Health [37], 22.3% of respondents (among the residents of the capital – every third one [38, p. 116]) felt a need for psychological assistance. They have significantly higher levels of phobic reactions, somatization, and suicidal risk, but lower levels of stress-reducing coping strategies. Moreover, there is a statistically significant trend of the growth of depressive symptoms with the development of the COVID-19 pandemic (from 0.75 to 0.93 on the SCL-90R scale) [39]. At the same time, there is a negative dynamic of an ability to objectively assess what is happening and comfort oneself, which makes it difficult to resist stress [38, p.118]. The authors conclude that a prolonged pandemic will lead to an increase in ineffective ways to reduce psychopathological symptoms –aggressive behavior especially.

The third level – behavioral. At the initial stage, behavioral reactions to a stressful pandemic situation may include increased anxiety, inattention, slowness of action, frequent anger. Subsequently, an ability to solve problems, work fully, and critically perceive information decreases (which puts a person at risk of cyber fraud); defensive (avoidance) behavior [40], panic purchases, constant monitoring of news [41], smoking, alcohol abuse, aggressive behavior, gambling, suicidal thoughts and attempts, etc. occur [42]. Moreover, all these reactions appear not only during the pandemic: they become a "long-lasting" burden, stretching over years and even a person's entire life [43]. Let us overview the most dangerous types of destructive behavioral reactions during the COVID-19 pandemic.

Forced isolation, financial difficulties, and alcohol abuse are the causes of increased ***domestic violence***, which, in turn, entails a threat not only to physical, but also to mental health [44; 45, 46]. People in a confined space take their anxiety and irritation out on their loved ones – especially women, children, and elderly people.

[3] Luhby T. Anti-anxiety medication prescriptions up 34% since coronavirus. *CNN*. April 16, 2020. Available at: https://edition.cnn.com/2020/04/16/health/anti-anxiety-medication-us-demand-coronavirus/index.html (accessed: January 29.01.2021).

[4] Schwartz B.J. New Poll: COVID-19 Impacting Mental Well-Being: Americans Feeling Anxious, Especially for Loved Ones. *APA News*. March 25, 2020. Available at: https://www.psychiatry.org/newsroom/news-releases/new-poll-covid-19-impacting-mental-well-being-americans-feeling-anxious-especially-for-loved-ones-older-adults-are-less-anxious (accessed: January 21, 2021).

Thus, in the Chinese province of Hubei, a number of police calls during the quarantine have tripled. In France, only in the first week of quarantine, a number of domestic violence cases increased by a third; in the UK, a number of calls to the helpline of the organization for combating domestic violence grew up by a quarter [47]. In Australia, people were 75% more likely to score the query "what to do in a situation of domestic violence" in the Google search bar, in Brazil – by 50% [46]. In Denmark, Spain, and Cyprus, women also began to seek help more often[5]. According to the Ombudsman in the Russian Federation, a number of victims and cases of domestic violence increased by 2.5 times in April.

More data suggest that a correlation between mental illness and domestic violence exists [48; 49]. Nearly a quarter of people who committed family homicides had been in contact with psychiatric services for a year prior to the crime, and a third had psychiatric symptoms at the time of the crime [50]. This correlation is largely caused by an influence of alcohol and psychoactive substances (surfactants) [43], and it proves the urgent need for continuous provision of qualified support to mentally ill and potential victims of domestic violence – even during quarantine measures and self-isolation.

Continuing the topic of alcohol dependence, we add that, according to the team of scientists led by J. Rehm, at the first stage of the fight against COVID-19, the scenario of a decrease in the level of ***alcohol consumption*** due to the decrease in its physical and economic availability was more likely. However, in the United States, there was an increase in alcohol sales in February – March [51; 52], in June – more than 13% of respondents reported that they started or increased drug use to cope with stress or emotions associated with COVID-19, and among those under 24 years of age – every fourth, and in the age group of 25–44 years – every fifth [53].

[5] Nazarova N. Locked together. How victims of domestic violence live in quarantine. April 7, 2020. Available at: https://www.bbc.com/russian/features-52184701

Increased psychological distress on the background of financial difficulties, social isolation, and insecurity feeling, according to Rehm, can further exacerbate alcohol use and increase the associated harm in the medium- and long-term perspective [54; 55].

For example, a year after the SARS pandemic in China, nearly 5% of men and 15% of women reported increased alcohol consumption [56]. The risks are particularly high among medical workers. For those employees who were either quarantined or worked in the "red zone", the risk of alcohol disorders, was about 1.5 times higher than that of other hospital employees even three years after the "SARS" outbreak [57].

Any increase in alcohol consumption in the current situation will not only increase the usual burden of diseases associated with it [54; 55], but also strengthen the risks of contracting COVID-19 by weakening the immune system [58].

Despite a low mortality rate from the SARS-CoV-2 virus, fear of the outcome, stigma, and financial losses often cause people to suffer, and it leads to impulsive decisions [59]. The pandemic, being a chronic phenomenon with uncertain and persistent biopsychosocial consequences for several months, can contribute to the increased ***suicidal behavior*** [59; 60]. There is evidence of an increase in the suicide rate during the epidemics of bubonic plague [61], "Spanish flu" [62], "SARS" [63], Ebola [64]. Suicide cases are reported in China, India, Bangladesh, Italy, and the United States of America [65–68].

According to an online survey, conducted in the United States in late June, one of ten (10.7%) respondents seriously considered suicide in the last month. The share of such people is noticeably higher among those aged 18–24 (25.5%), people without education (30%), racial/ethnic minorities (15.1–18.6%), persons who provide free adult care (30.7%), and those who work (21.7%). Moreover,

only 22–24% of them had been observed by a specialist earlier for anxiety or depression, 44% – for PTSD [53].

Torales' review [69] reported increased self-harm thoughts among medical professionals working with COVID-19 [70].

A Pakistani study revealed 29 cases of suicide, 16 of which were directly related to COVID-19. The majority of suicides, according to the authors, occurred due to the economic downturn caused by the lockdown. Fear of infection was the second factor contributing to suicide [71].

A study conducted in Canada predicted an increase in unemployment in 2020–2021, which will lead to an increase in the number of suicides to the level of 11.6–14.0 cases per 100,000 people in 2020 and to 13.6 in 2021. As a result, 2114 "extra" suicides will occur in 2020–2021 [72].

These results show that suicide prevention in the context of COVID-19-related unemployment is a top priority. In addition, timely access to mental healthcare, financial support, and social/work support programs, as well as optimal treatment for mental disorders, are urgently needed.

Domestic studies on suicidal behavior are not so numerous. In April 2020, the staff of V.P. Serbsky National Medical Research Center for Psychiatry and Narcology conducted a comparative study on the frequency of suicides in five entities of the Russian Federation. It showed that the mortality suicide rate even decreased compared to the period in 2019. According to the authors, this was caused by "the mobilization of a body's internal reserves, aimed at preserving humanity as a biological species" [73, p.4].

The staff of the Mental Health Research Center revealed a statistically significant increase in the frequency of suicidal thoughts among Russians as the pandemic progressed (the frequency of serious intentions was noted among 4.5% of respondents in late March, and every tenth respondent mentioned it late June). The increase in the severity of suicidal thoughts lags behind the growth of depressive symptoms. Probably, suicidal ideas do not appear or increase immediately, but act as a delayed effect of stress [39, p. 12]. It is not explained by an "objective" threat of infection and fears for life, but it is experienced as an "indefinite" anxiety associated with measures to counteract the pandemic – restrictions of social interaction, loneliness, uncertainty [39].

According to E.B. Lyubov and his colleagues from the Moscow Research Institute of Psychiatry, we should expect "an increase in suicides in Russian regions with relatively low suicide rates. In recessive regions with chronic economic stagnation and depopulation, the "contribution of the Coronavirus", on the contrary, may not be that noticeable due to adaptation to stressful events ("if you have not lived richly, you will not have to get used to it"), low availability of medical care, and epidemiological records. Experts believe that mortality rates and suicide rates may remain increased for several years, and regional indicators may be increased only after an acute phase of the pandemic – especially in high-risk groups" [74, p. 36].

Suicide factors during the pandemic constitute two groups:

1. ***Psychological:*** social isolation, anxiety, fear and uncertainty (infection/infection of others/availability of specific treatment or vaccination in the near future), poor sleep quality and eating habits [75], previously diagnosed mental health problems, relapse of a disease due to violations of a treatment regime and restrictions on access to help, alcohol, and psychoactive substances use [76].

2. ***Social:*** financial crisis, unemployment, limited supplies of basic necessities, domestic violence, school closures, exposure to vulnerable groups (homeless/unemployed/children/elderly), COVID-19 diagnosis, hospitalization in COVID-19 intensive care units, burnout among frontline medical workers, death of family members, stigmatization and discrimination due to the

outbreak, restrictions on participation in religious meetings or visiting religious places, and the "infodemic" phenomenon [77–80].

Healthcare workers, elderly people, migrants, homeless, economically vulnerable, and people with pre-existing mental disorders, substance abuse, and a family history of suicide are at higher risk of suicide.

Another behavioral response to the COVID-19 problem may be ***"avoidance" or defensive behavior***. After the end of the quarantine period, many participants continue to behave in such a way to avoid its repetition. More than half of them avoid those who cough or sneeze, a quarter of them do not visit crowded places, and every fifth avoid all public places for a few weeks after the quarantine period [81]. For some, the return to normal life has been delayed for many months.

Several scientists call ***changes in habits*** another type of behavioral response to a pandemic situation. Thus, an Italian study revealed that a third of respondents had an increased appetite during the lockdown period, while 18%, on the contrary, had a reduced appetite. As a result, almost half of the study participants experienced weight gain. Nearly 3% of smokers quit smoking during this period, probably due to fear of an increased risk of respiratory distress and mortality from COVID-19 [82].

Thus, we summed up possible disorders of a body (physiological, including neuropsychiatric changes due to exposure to the virus), and the psyche (mental and behavioral) of a person, mostly caused by measures introduced to combat the pandemic, which characterize the damage to mental health caused by the COVID-19 pandemic.

Let us analyze ***the factors provoking adverse mental outcomes among some population groups***.

1. COVID-19 disease, according to the results of most studies, may provoke psychological instability [23; 83–88]. More severe symptoms are observed during acute illness, due to exposure to the virus itself and fear for one's life, loneliness, forced isolation, poor health: confusion (on average, 28% of patients), depressed mood (33%), anxiety (36%), memory impairment (34%), insomnia (42%) [23]. One study revealed that the level of post-traumatic stress symptoms (PTSD) among Covid-positive patients in the initial period of the disease was extremely high (96.2%) [89].

In the post-disease stage (after suffering from coronavirus infections, such as SARS and MERS), the symptoms are less pronounced, but they persist. Insomnia was identified among 12% of respondents, irritability – 13%, depressive or anxiety disorder – 15%, memory impairment and fatigue – 19%, traumatic memories – 30%, PTSD symptoms – every third respondent [23].

According to another retrospective analysis of more than 60 thousand electronic medical records of Covid-positive patients, conducted by M. Taquet and colleagues in 2020, the frequency of any psychiatric diagnosis after 0.5–3 months after a positive test for COVID-19 was 18% (a third of which was a first-time diagnosis). The most frequent one was anxiety disorder (especially adaptation disorder and generalized anxiety disorder, less often – panic and post-traumatic stress disorder) [84].

There is evidence that patients who have experienced COVID-19 in intensive care units have numerous neurological, cognitive, and psychological symptoms [90]. However, it should be noted that high rates of post-traumatic symptoms of anxiety and depression were also reported from clinically stable people discharged from the hospital after recovering from COVID-19 [91].

2. Psychiatric predictors. A medical history of mental disorder is a significant risk factor for relapse during the pandemic [92–95]. Individuals with pre-existing mental health problems have reported increased symptoms and decreased access to services and support since the beginning of the COVID-19 pandemic [68; 96–99].

Moreover, studies indicate that many people had undiagnosed diseases during the introduction of quarantine measures – including psychiatric ones [100]. Thus, during the lockdown period in the UK in March 2020, there was a 50% decrease in referrals for mental health problems compared to the expected demand. In turn, diagnostic delays among patients, for example, with depression can cause increased mortality, including suicides [101].

The reasons for the vulnerability of a group of mentally ill people during a pandemic may be as follows: (1) such people are more susceptible to emotional responses due to their high stress sensitivity compared to general population; (2) neurotoxic SARS-CoV-2 virus can cause a violation of the stress system regulation [102]; (3) mental disorders (especially attention deficit hyperactivity disorder, bipolar disorder, depression, and schizophrenia [103]) may increase the risk of SARS-CoV-2 infection [68; 104–109] (by 1.6 times [84]), pneumonia [68], and death [110; 111] (2–3 times more often [112]); (4) physical distancing reduces the availability of many types of drug, family, social, and psychiatric support [68; 98; 113; 114]; (5) serious functional disorders prevent access to medical care and compliance with a doctor's instructions [115; 116]; even a patient with depression is about three times more likely to not follow the treatment recommendations [117]; (6) inpatient psychiatric facilities are often outdated; (7) resources are diverted from patients with chronic diseases (including mental disorders) to fight COVID-19; (8) most primary care physicians in COVID-19 are not able to work with neurocognitive and mental disorders.

Patients with dementia, Alzheimer's disease, people in a suicidal crisis, patients with obsessive-compulsive disorder [33], panic attacks and other anxiety disorders, eating disorders [118], and autism spectrum disorders [119; 120; 121] are *especially vulnerable in the group of mentally ill patients*.

3. Professional and labor risk factors. Work on the front line, especially in medical institutions, closely to sick people is the main risk factor for psycho-emotional problems during a pandemic. The so-called frontline health workers can be affected by the fear of infection, lack of protective equipment, death of patients and colleagues, understaffing, need to make extremely difficult decisions, including ethical ones [122], separation from families, loneliness, and physical fatigue.

They experience great stigmatization, feelings of helplessness, guilt, loneliness, fear, anger, exhaustion, detachment, anxiety, irritability, insomnia, poor concentration and indecision, poor productivity, and unwillingness to work. In the future, they are more likely to exhibit "avoidance" behavior [122; 123].

Most studies on the mental health of medical workers during previous pandemics also show an increase in their distress, depression, anxiety, and post-traumatic stress[6] [124–127].

According to the results of a Chinese study, during the COVID-19 pandemic, symptoms of anxiety disorder were detected among 36% of medical workers, depressive disorder – 20%, poor sleep – 24% [32]. According to the results of another study, the prevalence of depression and anxiety is even higher (51 and 45%, respectively), insomnia – 36%, and stress-related symptoms – 74% [128]. These symptoms were more common among female junior medical employees directly involved in the diagnosis and treatment of COVID-19 [129].

In general, according to various studies, 9–51% of medical professionals experienced symptoms of depression, anxiety – 15–45%, sleep disorders – 8–36%, excessive stress exposure – 7–72%,

[6] Murphy J., Spikol E., McBride O., et al. The psychological well-being of frontline workers in the United Kingdom during the COVID-19 pandemic: first and second wave findings from the COVID-19 Psychological Research Consortium (C19PRC) Study. *PsyArXic Preprints*. Available at: https://psyarxiv.com/dcynw/ (accessed: January 29, 2021).

PTSD – 8–50%[7]. Even three years after the SARS outbreak, this group still had symptoms of post-traumatic stress [57], depression, and alcohol dependence [130].

However, three studies did not reveal an increase in mental disorders among healthcare professionals due to COVID-19 compared to general population[8] [131].

Several scientists believe that the increase in distress among doctors amid the pandemic may be temporary, not pathological. Distress can be normalized through peer support, Schwartz rounds, and active monitoring, rather than formal psychiatric interventions [132]. These findings were repeated in 2020 in Wuhan, where health professionals reported the need for adequate rest and personal protective equipment, rather than mental health interventions [124]. Studies have shown that full breaks for food and sleep affect mental well-being more than a number of hours worked [133].

Other risk factors for health workers include lack of social support and communication, maladaptive coping strategies, and insufficient training [129]. In turn, negative emotions experienced by staff treating infected patients are assessed by them as trigger events that lead to errors and delays in providing care to patients [134], which also increases the burden of COVID-19.

4. Financial and economic prerequisites. The loss of financial stability during the pandemic due to self-isolation and quarantine creates serious socio-economic prerequisites for the development of psychological disorders symptoms, anger, and anxiety not only during this period, but also after a few months [71; 135–139].

Thus, in Russia, according to several public opinion polls conducted in late June by various organizations, economic problems are extremely urgent. Nearly 84% of respondents were concerned about the pandemic-related economic crisis[9]. Seven out of ten respondents assessed the threat of a pandemic as significant for the Russian economy, and for their personal financial situation – more than 40%[10]. 42% of respondents noted the deterioration of their family's financial situation over the past three months, with one of three forced to borrow, and one in five – to take out loans. A third of respondents reported wage cuts, and a quarter – layoffs[11]. Population's expectations are quite pessimistic (63% expect further deterioration of the financial situation). More than half are convinced that the state is taking insufficient measures to provide material support to the population in the current situation[12].

The importance of the economic factor is also discussed in foreign studies. For example, among those who lost their jobs and income in the United States, more than half reported anxiety or stress; people with lower incomes were more likely to report serious negative consequences for mental health.

According to Pierce, in the lowest-income households, an average level of mental disorder was 13.9 points (among high-income people – 12.0); among the unemployed – 15.0; economically inactive – 15.3 (employed – 12.5 or retired – 11.1).

[7] Recommendations for medical professionals who are under conditions of increased psychoemotional stress during the COVID-19 pandemic. Moscow, 2020. Available at: https://edu.rosminzdrav.ru/fileadmin/user_upload/specialists/COVID-19/dop-materials/13-5-20/Rekomendacii_dlja_medrabotnikov.pdf (accessed: January 21, 2021).

[8] Jia R., Ayling K., Chalder T., et al. Mental health in the UK during the COVID-19 pandemic: early observations. *BMJ medRxiv,* 2020 (preprint published online May 19). DOI: https://doi.org/10.1101/2020.05.14.20102012. Available at: https://www.medrxiv.org/content/10.1101/2020.05.14.20102012v1.full.pdf (accessed: January 29, 2021); Kwong A.S.F., Pearson R.M., Adams M.J., et al. Mental health during the COVID-19 pandemic in two longitudinal UK population cohorts. *BMJ medRxiv,* 2020; (preprint published online June 18). DOI: https://doi.org/10.1101/2020.06.16.20133116. Available at: https://www.medrxiv.org/content/10.1101/2020.06.16.20133116v1 (accessed: January 29, 2021).

[9] Data of Russian Public Opinion Research Center.

[10] Data of the RANEPA monitoring.

[11] Data of the Levada-Center.

[12] Data of the RANEPA monitoring.

Although the rates of mental disorders were higher among people who were unemployed or engaged in other economically inactive roles before the isolation, the greatest increase was recorded among those who worked before the pandemic [131].

In addition, numerous theoretical models link the projected increase in unemployment and the financial crisis with the increase in suicides [140–143]. Thus, due to unemployment in 2010–2011 (after the 2008 economic crisis), the suicide rate increased by 20–30% [144].

Russian economists, politicians, and experts also agree that the consequences of the 2020 crisis will be more dramatic than those of the 2008–2009 crisis[13]. They forecast mass unemployment. Its level may jump to 8–10% of the labor force (a pessimistic scenario), about 15 million of Russians may suffer or lose their jobs[14]. Preliminary estimates of the International Labor Organization indicate that the growth of global unemployment may range from 5.3 million (low scenario) up to 24.7 million people (high scenario)[15].

Given that, according to WHO, every suicide among population is accompanied by more than 20 attempts, we may soon expect an increased load on mental healthcare services [144]. The readiness of all healthcare facilities can be vital to understanding and preventing it.

5. Media (infodemic) predictors. Most people around the world now have easy access to information thanks to an Internet connection and electronic media, which helps to share information – about the pandemic too. Many researchers speak of a parallel infodemic (i.e., overabundance of information (accurate and not)). Like an epidemic, it spreads between people through digital and physical information systems [145]. As in the previous SARS (2003), H1N1 (2009), and MERS (2012) pandemics, media have significantly contributed to the COVID-19 infodemic [146; 147], provoking a surge of numerous rumors, hoaxes, conspiracy theories, and misinformation regarding the etiology, outcomes, prevention, and treatment of this disease. The spread of misinformation masks healthy behaviors and promotes erroneous practices that increase the spread of the virus and ultimately lead to the destruction of mental health [148]. Media position COVID-19 as rather an exceptional threat, which exacerbates panic and stress among general population, provokes the onset or relapse of anxiety, obsessive-compulsive, and post-traumatic stress disorder [149]. Social networks play a significant role in the infodemic phenomenon [19]. Their consumption increases the chances of anxiety (by 1.7 times) and depression (by 1.9 times) [150]. Thus, the high prevalence of mental health problems (depression – 48.3%, anxiety – 22.6%) during the outbreak of the new coronavirus infection in Wuhan correlated with the frequent use of social networks (nearly 80% of those who have problems) [150]. According to another study on people with dysfunctional anxiety (which arose during the pandemic), every fifth respondent spent 3–5 hours watching the news daily, a quarter – 5–7 hours, and another 20% – more than 7 hours. At the same time, two-thirds of them had never suffered from such a disease before and had not sought treatment for anxiety [151].

Several studies show that the commonness of television exposure can provoke not only an increase in stress levels [152], development of PTSD symptoms, and the risk of suicide [153], but also

[13] Dynkin A., Telegina E. Black swan dance: world premiere. Available at: https://scientificrussia.ru/articles/rossijskie-spetsialisty-ob-ekonomicheskih-aspektah-pandemii (accessed: January 21, 2021).

[14] On the medium-term forecast of the development of the Russian economy in the context of the coronavirus pandemic and a possible crisis of the world economy. Report of the Center for Macroeconomic Analysis and Short-term Forecasting. Available at: http://www.forecast.ru/Forecast/fore052020.pdf (accessed: January 21, 2021).

[15] Available at: https://www.interfax.ru/business/703088 (accessed: January 21, 2021).

new cardiovascular diseases within 2–3 years after a stressful event [152].

Anxiety and uncertainty caused by the infodemic, in turn, may lead to additional media consumption, creating a vicious circle. Media-fueled distress can have a negative impact on the healthcare system (for example, provoking an increase in referrals and visits to emergency departments) [6].

The role of media and communications in the field of public health needs to be comprehended and studied further, as they will become an important tool in the fight against COVID-19 and future outbreaks [146]. Most researchers emphasize the importance of informational reliability disseminated through the media and social networks, as well as the search for viable strategies to counter disinformation during a pandemic [19; 145; 147; 150]. The response to the COVID-19 pandemic and related infodemics requires rapid, regular, systematic, and coordinated actions by various sectors of society and government, and it must be monitored by regulatory and law enforcement authorities, along with the provision of telemedicine services that provide accurate information about COVID-19 [148].

6. Socio-demographic prerequisites for mental health deterioration are ambiguous. According to most studies, young urban women are more vulnerable to the impact of the pandemic on their psyche [32; 131; 154; 155]. For example, there has been a steady increase in the level of psycho-emotional disorders among general population (from 16.7% in 2014–2015 to 18.9% in 2018–2019) in recent years in the UK. It was much more pronounced in 2020, especially among women aged 16–24 years (from 32% in 2017–2018 to 44% in April 2020) [131]. Psycho-emotional vulnerability of young women in crisis periods is also confirmed by the results of previous studies [156–159].

Several authors reveal an increasing number of mental health problems among children and adolescents during the pandemic [77; 160; 162]. In previous pandemics, quarantined children were more likely to suffer from acute stress disorder, adjustment disorders, and grief than those not quarantined [163]. An increased number of young people contacting the helpline with anxiety symptoms has also been reported[16].

However, Y. Wang and his colleagues revealed an increased risk of anxiety among, on the contrary, people older than 40 years (40% higher than among younger people) [42]. Given that elderly people are at particularly high risk for severe COVID-19 and its associated mental health consequences (some cognitive impairments), they should also receive significant attention from mental health professionals during the pandemic [113].

In some studies, no correlation between adverse psychological outcomes of the pandemic, gender and age was found.

The scientists also revealed higher scores of the mental distress level among people who are single or do not live together with a partner, as well as among those having one little child [131]. According to another study, the presence of one child in a family contributes to distress during the coronavirus pandemic, and the presence of more than three children, on the contrary, increases psychological stability [154].

An additional stressor during a pandemic is, of course, a quarantine, especially if it is a prolonged one. People experience fear of infecting their relatives, boredom, frustration, lack of food supplies, stigmatization, difficulties in distance learning, a sense of lack of freedom and restrictions on their own rights and worry about their health.

[16] Weale S. Sharp rise in number of calls to ChildLine over coronavirus. Available at: https://www.theguardian.com/world/2020/mar/27/sharp-rise-in-number-of-calls-to-childline-over-coronavirus (accessed: January 21, 2021).

Considering studied increased risk factors, it is possible to identify the main population groups vulnerable to the psychosocial and psycho-emotional consequences of the pandemic the most:

- those infected with COVID-19 and their quarantined family members;
- relatives of those who died due to the coronavirus;
- people with pre-existing psychiatric problems, including those dependent on alcohol and surfactants;
- healthcare workers who take care after infected people;
- people with low income, financial instability, migrant workers, unemployed;
- victims of domestic violence;
- lonely people;
- socially isolated groups (prisoners, homeless people, refugees, etc.);
- elderly people;
- children and teenagers;
- patients with concomitant somatic diseases;
- people with disabilities.

After studying and summarizing the results of numerous studies on the psycho-emotional burden of the COVID-19 pandemic, we present **several main directions for strengthening mental health** in this crisis period:

1) creation of a formal, integrated, unified platform for mental health counseling during a pandemic;

2) integration of mental health services into the COVID-19 care system;

3) provision of employment and material support for population;

4) development of a strategy for informed media policy on pandemic reporting;

5) events aimed directly at vulnerable groups;

6) promotion of a healthy lifestyle;

7) mitigation of a negative impact of quarantine on human psyche;

8) further scientific research.

There is a need for interdisciplinary well-coordinated work of representatives of all mental health sciences with the involvement of people with an experience of solving problems. The neuro-psychiatric and psycho-emotional burden of the pandemic should be comprehended and studied – not just now, but in the future. The results of direct studies could help to develop responses to future waves of infection in terms of preventing the damage they cause to population's mental well-being and reducing the burden of the disease.

Conclusion

By late 2020, there were thousands of articles in electronic databases on various aspects of a negative impact of COVID-19 on population's mental health. Their results are sometimes contradictory due to differences of the methods used. Some of them are based on the results of cross-sectional studies, a small part – on longitudinal ones. In some works, the biological impact of the virus itself on the human nervous system is considered. Others, similar to the current work, are overviews, and they are devoted to many aspects.

Nevertheless, we have not found a single study that characterizes all the transformations which occur as a result of the spread of the COVID-19 virus, measures taken to combat it (neuropsychiatric, psycho-emotional, behavioral) and lead to the loss of mental health as the "psycho-emotional burden of the pandemic". The authors of the current work have done it for the first time. Also, possible negative manifestations of mental health loss were structured into three main blocks: physiological, mental, and behavioral. It is the author's contribution to the development of theoretical science.

As a result, the burden of the new coronavirus pandemic in terms of mental health loss can be expressed in the following indicators:

1. Physiological level:

a) physical reactions to a stressful situation (increased heart rate, blood pressure, and blood sugar; impaired appetite, sleep, headache, body aches, endocrine disorders);

b) increased damages of the central and peripheral nervous system, neuropsychiatric and cerebrovascular complications (strokes, encephalopathy), changes of mental status (as well as disruption of the cardiovascular, digestive, and endocrine systems of a body) due to the neurotoxic effects of the SARS CoV-2 virus.

2. Mental level:

a) increased anxiety, unease, fear, anger;

b) onset or relapse of panic, anxiety, depressive disorders, adjustment disorders, and appearance of PTSD symptoms.

3. Behavioral level:

a) increase in aggressive behavior (surge of domestic violence);

b) auto-destructive behavior (alcohol and drug addiction, suicidal behavior);

c) internet and computer addictions;

d) avoidace (defensive) behavior;

e) change of food habits;

f) panic purchases, panic calls to the emergency service, etc.

These disorders in a body, psyche, and behavior inevitably lead to a significant deterioration of victims' mental state, decrease in their quality of life, disability, and even death. This puts an increasing strain on the healthcare system, diverting such limited resources needed to fight the pandemic. In addition, the healthcare crisis has led to many potentially missed or delayed diagnoses of high-risk diseases if they are not promptly diagnosed and effectively treated. Primary and secondary healthcare services should be prepared for a large influx of patients and increased severity of their diagnoses [77; 100; 164].

All this will entail direct and indirect economic costs for society (for treatment and rehabilitation, reducing the share of the working-age population), expanding the burden of the disease. It is important that the state loses the labor and human potential necessary for the economic recovery after the pandemic.

Most consequences of the pandemic regarding mental health are preventable if we develop a system for early diagnosis of mental health problems (especially in COVID-19 institutions), psychological support for population and risk groups (those who have had coronavirus and their families; healthcare workers; people suffering from mental disorders and those in a suicidal crisis; lonely people; those who lost income and jobs; victims of domestic violence; elderly people; children and adolescents; socially isolated groups; people with concomitant somatic diseases and disabilities). Prevention of the socio-economic consequences of the pandemic is extremely important.

We need further research on how the psychoemotional burden of the pandemic can be mitigated now and later, as mental health consequences will take longer to manifest themselves, and they peak after the pandemic. As economic consequences of isolation develop, vacations turn into layoffs, tax and mortgage breaks expire, and a recession takes effect, should we expect not only sustained distress and clinically significant mental health deterioration [131] among some people, but also well-described long-term impact of the economic downturn on mental health, including an increase in suicide rates [165]. According to experts, up to 70% of the world's population may potentially need psychological help during the f COVID-19 spread[17].

Nevertheless, several researchers also note a new positive experience of people gained during the coronavirus outbreak. This is a pride that we have shown resilience and coped with difficulties, a sense of community against one misfortune, and a deep satisfaction after helping each other. There is also a

[17] Axelrod J. Coronavirus may infect up to 70% of world's population, expert warns. March 2, 2020. Available at: https://www.cbsnews.com/news/coronavirus-infection-outbreakworldwide-virus-expert-warning-today-2020-03-02/ (accessed: December 21, 2020).

decrease in the stigmatization of mental disorders. Many people now experience psychological problems that they could talk about. According to experts, it should contribute to their earlier detection and treatment, and therefore reduce the burden of the disease.

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BOOK REVIEWS AND REPORTS

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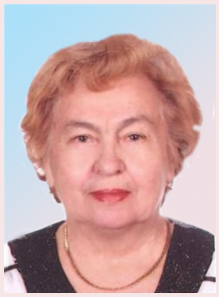
A Review of the Report: Demographic Situation and Demographic Behavior of the Population of the Vologda Oblast: 1st Regional Demographic Report

A.A. Shabunova, O.N. Kalachikova, A.V. Korolenko, A.P. Budilov, A.N. Gordievskaya; ed. A.A. Shabunova. Vologda: VolRC RAS, 2020, 122 p.



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The regional scientific report provides a comprehensive scientific analysis of the formation and development of the demographic situation in the Vologda Oblast in the first decade of the 21st century. The authors note that a distinctive feature of the region is depopulation, which is formed under the influence of migration and natural population decline. It is noteworthy that the paper analyzes in detail the demographic processes in the context of the Vologda Oblast municipalities. This gives an idea of the development trends of any territory. The author compares the development of demographic processes in the Vologda Oblast and the Russian Federation as a whole, which allows us to determine the place and role of the region in the development of the country's population. Describing the ongoing demographic processes in the region, the authors illustrate them graphically, which enhances the perception of the demographic situation. It is quite logical that a detailed analysis of the demographic situation allowed the authors of the report to draw conclusions about the prospects for the Vologda Oblast population dynamics until 2035.

The authors approached the explanation of the demographic processes occurring in the Vologda Oblast on the basis of sociological studies of population's reproductive and migration behavior. And this is fair, since understanding of these aspects makes it possible to solve problems in the field of forming the demographic potential of the territory.

For citation: Motrich E.L. A review of the report: Demographic situation and demographic behavior of the population of the Vologda Oblast: 1st regional demographic report. A.A. Shabunova, O.N. Kalachikova, A.V. Korolenko, A.P. Budilov, A.N. Gordievskaya; ed. A.A. Shabunova. Vologda: VolRC RAS, 2020, 122 p. *Economic and Social Changes: Facts, Trends, Forecast,* 2021, vol. 14, no. 2, pp. 225–226. DOI: 10.15838/esc.2021.2.74.14

A logical continuation of this aspect of the study in the presented report is the generalization of measures to form the demographic potential in the Vologda Oblast on the basis of the state socio-demographic policy. Noting a positive results of the measures taken, the authors rightly note the unresolved problems. It is quite logical that the paper transitions from the analysis of federal demographic policy measures to the analysis of regional socio-demographic policy, emphasizing its significant role in overcoming the country's depopulation. At the same time, the authors of the report rightly draw attention to the "strengths" and "weaknesses" of socio-demographic policy in the region and express their opinion on state policy: on fertility in particular on the basis of the assessment of population according to the results of the sociological study.

The study of the demographic situation and demographic behavior of the Vologda Oblast population allowed the authors to formulate recommendations for improving federal and regional socio-demographic policy.

At the same time, I would like to note that the report does not pay enough attention to the analysis of the migration situation in the Vologda Oblast. Obviously, it is very important that a sociological analysis of the population's migration motivation in the Vologda Oblast is given. However, the conditions for conducting the attraction and consolidation of migrants are insufficiently discussed.

Despite this comment, the report "Demographic Situation and Demographic Behavior of the Population of the Vologda Oblast" is very useful for management and administrative structures of the studied territory, for scientists who deal with the problems of forming the population potential of the territories, and for anyone interested in demographic development and demographic policy of the state and specific regions of the Russian Federation.

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Public Opinion Monitoring of the State of the Russian Society

As in the previous issues, we publish the results of the monitoring of public opinion concerning the state of the Russian society conducted by VolRC RAS in the Vologda Oblast [1].

The following tables show the dynamics of a number of parameters of social well-being and socio-political moods of the region's population based on the results of the last "wave" of monitoring (April 2021) and for the period from February 2020 to April 2021 (last 6 polls).

We compare the results of the surveys with the data for 2000 (the first year of V. Putin's first presidential term), 2007 (the last year of V. Putin's second presidential term, when the assessment of the President's work was the highest), 2011 (the last year of Dmitry Medvedev's presidency), and 2012 (the first year of V. Putin's third presidential term).

We also provide yearly dynamics of the data for 2018–2020[2].

In February – April 2021, he level of approval of the work of the President of the Russian Federation did not change significantly. The share of positive assessments is 50–52%, negative – 31.

The level of approval of the President's work was a little bit lower in April 2021 (by 2 p.p.) than in February 2020, when the share of positive assessments was 54%. The share of negative assessments in April 2021, compared to February 2020, did not change significantly (31%)[3].

[1] The polls are held six times a year in Vologda, Cherepovets, and in eight districts of the oblast (Babayevsky District, Velikoustyugsky District, Vozhegodsky District, Gryazovetsky District, Kirillovsky District, Nikolsky District, Tarnogsky District, and Sheksninsky District). The method of the survey is a questionnaire poll by place of residence of respondents. The volume of a sample population is 1,500 people 18 years of age and older. The sample is purposeful and quoted. The representativeness of the sample is ensured by the observance of the proportions between the urban and rural population, the proportions between the inhabitants of settlements of various types (rural communities, small and medium-sized cities), age and sex structure of the Oblast's adult population. Sampling error does not exceed 3%.

More information on the results of VolRC RAS polls is available at: http:// www.vscc.ac.ru/.

[2] In 2020, four "waves" of monitoring were conducted. Surveys in April and June 2020 were not conducted due to quarantine restrictions during the spread of Covid-19.

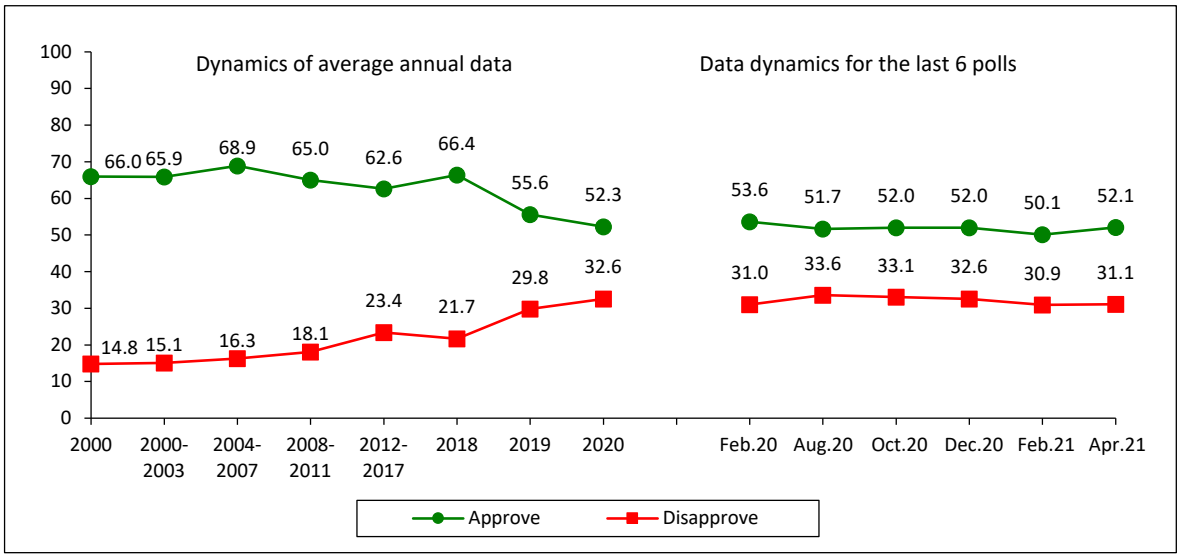
[3] Hereinafter, the results of a comparative analysis of survey data, conducted in April 2021, and the results of a last-year monitoring "wave", conducted in February 2020 (the last survey before pandemic restrictions), are given in the frame.

How do you assess the current performance of..? (% of respondents)*

Respond option	Dynamics of average annual data							Data dynamics for the last 6 polls						Dynamics (+/-), Apr. 2021 to Feb. 2020
	2000	2007	2011	2012	2018	2019	2020	Feb. 2020	Aug. 2020	Oct. 2020	Dec. 2020	Feb. 2021	Apr. 2021	
RF President														
I approve	66.0	75.3	58.7	51.7	66.4	55.6	52.3	53.6	51.7	52.0	52.0	50.1	52.1	-2
I disapprove	14.8	11.5	25.5	32.6	21.7	29.8	32.6	31.0	33.6	33.1	32.6	30.9	31.1	0
Chairman of the RF Government**														
I approve	-**	-**	59.3	49.6	48.0	41.1	38.7	37.9	38.9	38.8	39.1	37.6	38.8	+1
I disapprove	-	-	24.7	33.3	31.6	38.4	40.4	40.9	40.9	40.8	38.8	38.8	38.3	-3
Governor of the Oblast														
I approve	56.1	55.8	45.7	41.9	38.4	35.7	35.0	36.2	35.2	35.5	32.9	33.9	36.3	0
I disapprove	19.3	22.2	30.5	33.3	37.6	40.2	42.5	41.8	41.9	42.1	44.2	42.4	41.3	0

* Question: How do you assess the current performance of..?
According to the research methodology, the sampling error does not exceed 3%, so hereinafter changes with a difference of 2 p.p. are not taken into account or are considered insignificant; they are highlighted in blue in the tables. Positive changes are highlighted in green, negative changes are highlighted in red.
** The question was first asked in 2008. In 2020, the first poll was conducted in January 24–February 12. The current chairman of the RF Government M. V. Mishustin has just started his new work (January 16, 2020), therefore, respondents were asked about work of the former Prime Minister – Dmitry Medvedev.

In general, do you approve or disapprove of the work of the President of Russia?
(% of respondents, FSBIS VolRC RAS data)*



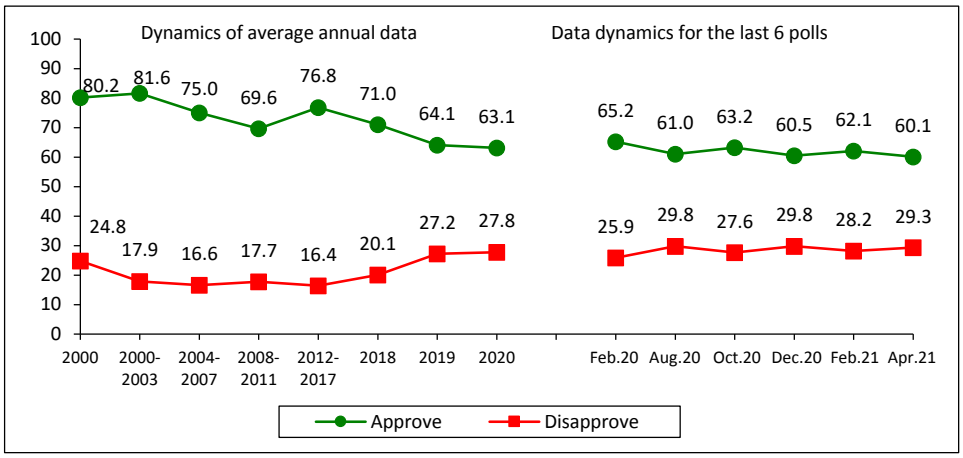
* Hereinafter, all graphs show the average annual data for 2000, 2018, 2019, 2020, as well as the average annual data for the periods 2000–2003, 2004–2007, 2008–2011, 2012–2017, corresponding to the periods of presidential terms.

For reference:

According to VCIOM data for February – first half of April 2021[4], the level of approval of the President's work was 61–62%, share of negative answers was 28–29%.

According to the latest data of the Levada-Center (February – March 2021[5]), assessment of the President's work slightly decreased: share of positive assessments was 2 p.p. lower (from 65 to 63%), negative assessments remained the same – 34–35%.

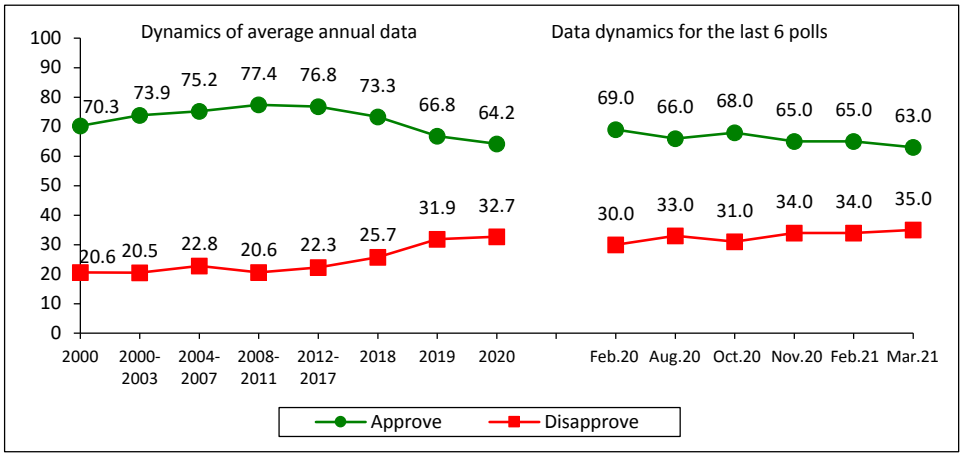
In general, do you approve or disapprove of the work of the President of the Russian Federation? (% of respondents; VCIOM data)*



Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Approve	-5
Disapprove	+3

* Question: In general, do you approve or disapprove of the work of the President of the Russian Federation?
Source: VCIOM data. Available at: https://wciom.ru/
Data for February 2021 – average value for two polls: conducted on February 7, 2021 and February 14, 2021.
Data for April 2021 – average value for two polls: conducted on April 4, 2021 and April 11, 2021.

In general, do you approve or disapprove of the work of V. Putin at the position of the President of Russia? (% of respondents; Levada-Center data)*



Annual dynamics (March 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Approve	-6
Disapprove	+5

* Question: In general, do you approve or disapprove of the work of V. Putin at the position of the President (Prime Minister) of Russia?
Source: Levada-Center data. Available at: https://www.levada.ru/ (no data for December 2020).

[4] At the moment of writing this article, VCIOM latest data were dated April 11, 2021. Source: VCIOM. Ratings. Available at: https://wciom.ru/ratings/dejatelnost-gosudarstvennykh-institutov

[5] Latest data – March 2021. Source: Levada-Center. Indicators. Available at: https://www.levada.ru/indikatory

From February to April 2021, there were no significant changes in the share of the Oblast residents who think that the President successfully strengthens Russia's international positions (46%), protects democracy and citizen's freedoms (31–32%).

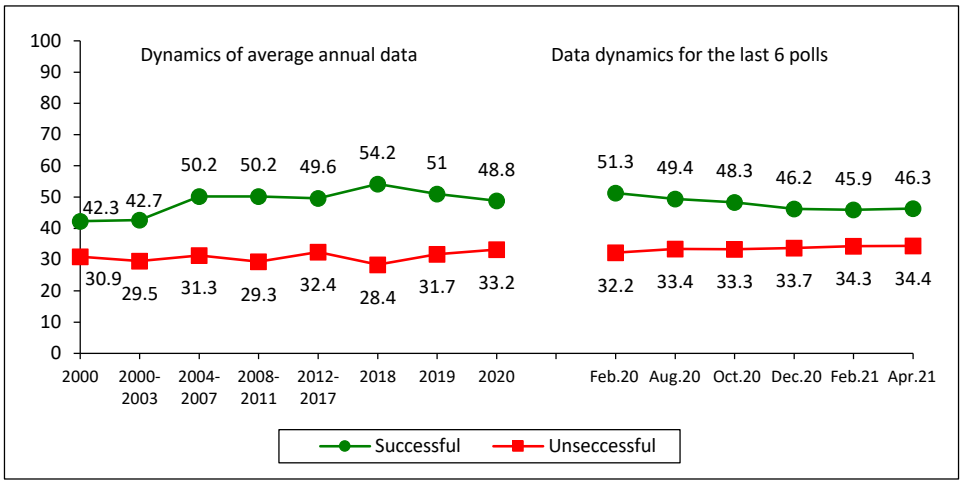
At the same time, negative changes are recorded in the assessment of the successfulness of the President in restoring order in the country (share of positive assessments has decreased by 4 p.p over the last two months – from 41 to 37%) and increasing the welfare of the population (share of negative assessments increased by 2 p.p. – from 61 to 63%).

Compared to February 2020, the share of positive assessments, regarding successfulness of the President's work, decreased in nearly all key issues:

- ✓ strengthening Russia's international positions – by 5 p. p. (from 51 to 46%);
- ✓ restoring order in the country – by 7 p. p. (from 44 to 37%);
- ✓ protecting democracy and strengthening the freedoms of citizens – by 4 p. p. (from 35 to 31%);
- ✓ boosting the economy and increasing the welfare of the population – by 3 p. p. (from 26 to 23%).

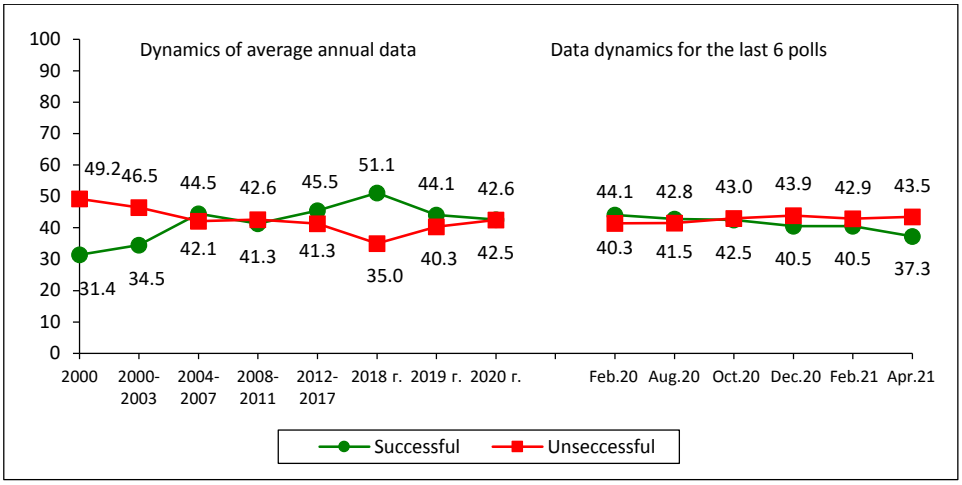
In your opinion, how successful is the RF President in coping with challenging issues..?
(% of respondents; FSBIS VolRC RAS data)

Strengthening Russia's international positions



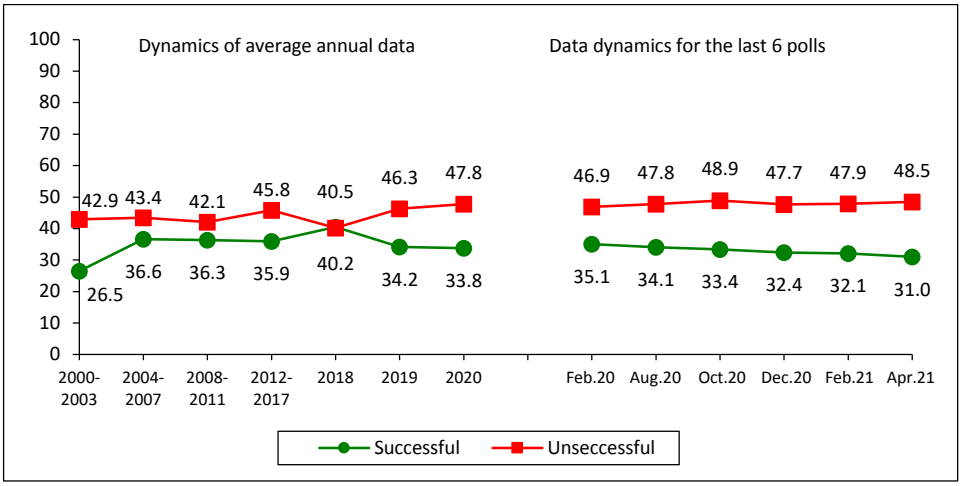
Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Successful	-5
Unseccessful	+2

Imposing order in the country



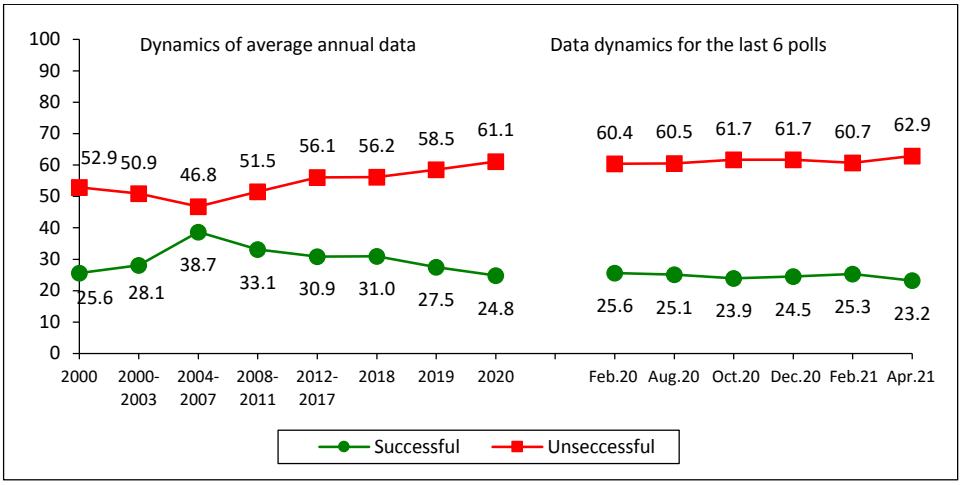
Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Successful	-7
Unseccessful	+2

Protecting democracy and strengthening citizens' freedoms



Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Successful	-4
Unseccessful	+2

Economic recovery and increase in citizens' welfare



Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Successful	-2
Unseccessful	+3

In February – April 2021, there were no significant changes in the structure of people's political preferences in the Vologda Oblast. The United Russia party still prevails (the share of its supporters is 31–32%), and the support for other parties is much lower: 10% – LDPR, 8–9% – KPRF, 3–4% – the Just Russia party.

The third of the region's population (36%) thinks that none of the political forces represented in the State Duma express their interests.

A similar structure of political preferences was recorded in February 2020 and on average for 2019 and 2020.

Which party expresses your interests? (%of respondents; FSBIS VolRC RAS data)

Party	Dynamics of average annual data										Data dynamics for the last 6 polls						Dynamics (+/-), Apr. 2021 to Feb. 2020
	2000	2007	2011	Election to the RF State Duma 2011, fact	2012	2016	Election to the RF State Duma 2016, fact	2018	2019	2020	Feb. 2020	Aug. 2020	Oct. 2020	Dec. 2020	Feb. 2021	Apr. 2021	
United Russia	18.5	30.2	31.1	33.4	29.1	35.4	38.0	37.9	33.8	31.5	33.2	30.9	31.1	30.9	30.5	31.5	-2
KPRF	11.5	7.0	10.3	16.8	10.6	8.3	14.2	9.2	8.8	8.4	8.9	8.6	8.8	7.3	8.3	8.7	0
LDPR	4.8	7.5	7.8	15.4	7.8	10.4	21.9	9.6	9.1	9.5	9.9	9.3	9.4	9.5	10.1	9.9	0
Just Russia	-	7.8	5.6	27.2	6.6	4.2	10.8	2.9	3.4	4.7	4.7	4.8	4.3	5.0	3.6	2.6	-2
Other	0.9	1.8	1.9	–	2.1	0.3	–	0.7	0.3	0.5	0.6	0.4	0.3	0.7	0.2	0.1	0
None	29.6	17.8	29.4	–	31.3	29.4	–	28.5	33.7	34.2	34.0	33.6	33.8	35.3	35.9	36.4	+2
Hesitate to respond	20.3	21.2	13.2	–	11.7	12.0	–	11.2	11.0	11.1	8.7	12.4	12.2	11.2	11.3	10.9	+2

Over the past two months, the indicators of the population's social well-being have improved:

- ✓ in February – April 2021, the share of people who positively assess their emotional state increased by 3 p.p. (from 60 to 63%);
- ✓ share of those who think that "everything is not so bad, and it is possible to live; it is difficult to live, but it is possible to stand it" – by 4 p. p. (from 70 to 74%).

At the same time, the share of people who subjectively classify themselves as "poor and extremely poor" remains consistently high (48% against 40% of those who consider themselves to be people with "average income").

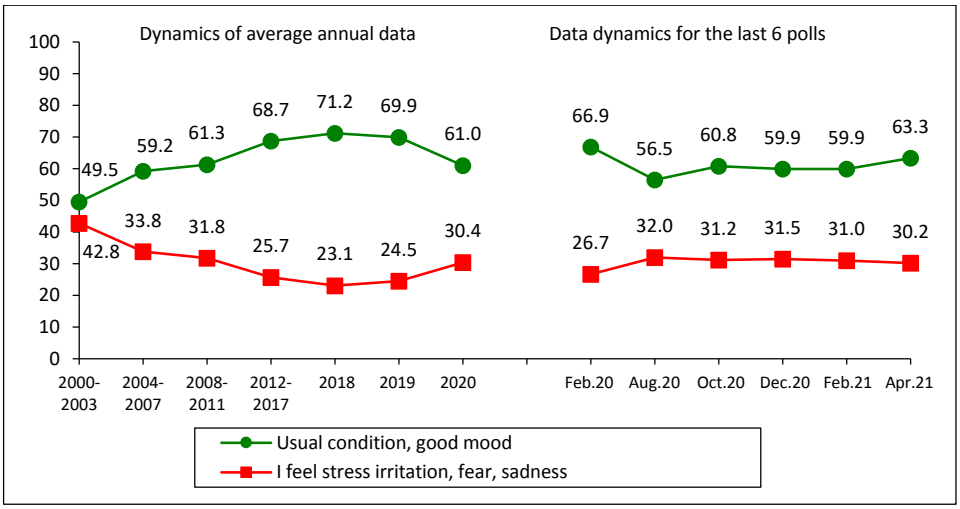
Moreover, in February – April 2021, Consumer Sentiment Index somewhat decreased (from 85 to 83 p.p.), which indicates an increase of pessimistic judgments among the population regarding the forecasts of the development of the economic situation in the country and their personal financial well-being.

Compared to February 2020, indicators of social sentiment decreased (share of positive assessments decreased by 4 p.p. – from 67 to 63%), the consumer sentiment index noticeably declined (by 8 points, from 91 to 83 p.p.).

Share of those who think that "everything is not so bad, and it is possible to live; it is difficult to live, but it is possible to stand it" has not changed significantly (74–75%), as the share of people, who refer to themselves as "poor and extremely poor" (40%).

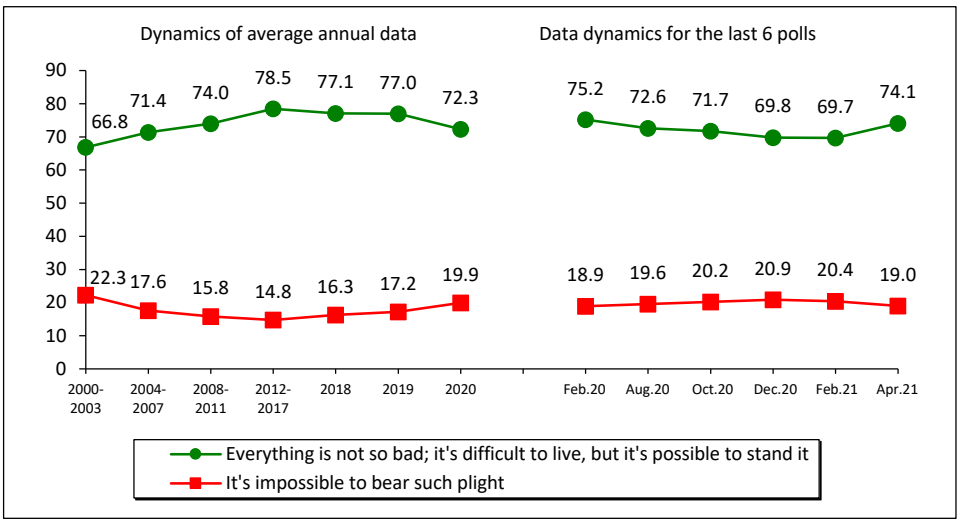
Estimation of social condition (% of respondents; FSBIS VolRC RAS data)

Social mood



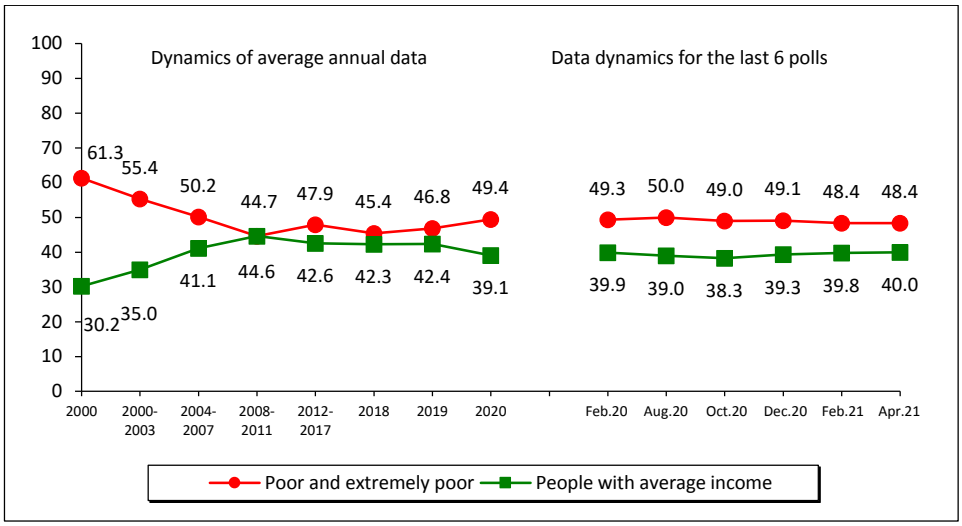
Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Usual condition, good mood	-4
I feel stress, irritation, fear, sadness	+4

Stock of patience



Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Everything is not so bad; its difficult to live, but its possible to stand it	-1
Its impossible to bear such plight	0

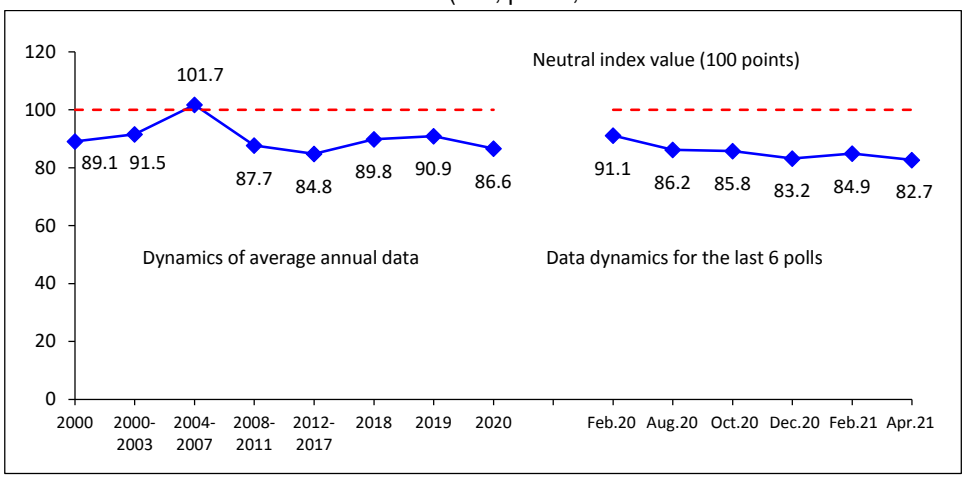
Social self-identification*



Annual dynamics (April 2021 to February 2020)	
Respond option	Dynamics (+ / –)
Share of people who consider their income average	0
Share of people who consider themselves poor and extremely poor	-1

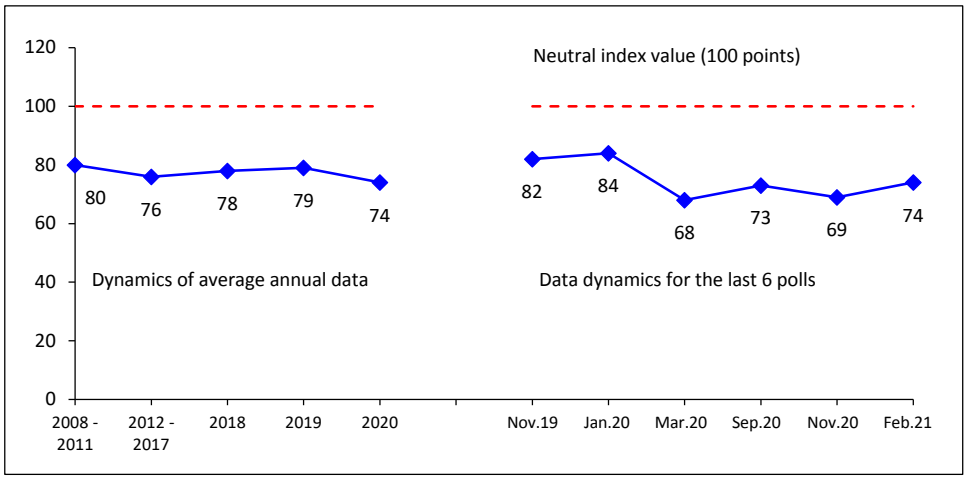
* Question: “Which category do You belong to, in your opinion?”

Consumer Sentiment Index (CSI, points; data of FSBIS VoIRC RAS for the Vologda Oblast)



Annual dynamics (April 2021 to February 2020)	
CSI	Dynamics (+ / –)
Index value, points	-8

Consumer Sentiment Index (CSI; Levada-Center data* for Russia)



Annual dynamics (February 2021 to January 2020)	
CSI	Dynamics (+ / –)
Index value, points	-10

* Index is calculated since 2008.
Source: Levada-Center data. Available at: https://www.levada.ru/indikatory/sotsialno-ekonomicheskie-indikatory/
Latest data is for February 2021. There are no data for the period from April to August 2020.

In February – April 2021, share of people who positively characterize their emotional state improved in most (in 9 out of 14) socio-demographic groups – especially among people aged under 30 years (from 61 to 67%), as well as those who, according to self-estimation of income, are among 60% of average-income residents of the region (by 6 p.p., from 60 to 66%). It is impossible not to note the increase in the share of positive assessments of social mood in the group of those who, according to self-assessments of their income, belong to the category of 20% of the least wealthy residents of the Oblast (by 6 p. p., from 44 to 50%).

Negative changes over the past two months are observed only among people who, according to self-estimates of their own income, belong to the category of 20% of the wealthiest population (by 5 p. p., from 76 to 71%).

At the same time, the most pronounced changes are recorded in the dynamics from February 2020 to April 2021. During this period, the mood deteriorated in 9 of the 14 socio-demographic categories of the population. The negative changes were particularly pronounced among the residents of Vologda (share of positive ratings decreased by 10 p. p., from 67 to 57%), as well as among people who, according to self-estimates of income, belong to the category of the 20% of the wealthiest residents (by 8 p. p., from 79 to 71%).

Social mood in different social groups (respond option "Wonderful mood, normal, stable condition", % of respondents; FSBIS VolRC RAS data)

Population group	Dynamics of average annual data							Data dynamics for the last 6 polls						Dynamics (+/-), Apr. 2021 to Feb. 2020
	2000	2007	2011	2012	2018	2019	2020	Feb. 2020	Aug. 2020	Oct. 2020	Dec. 2020	Feb. 2021	Apr. 2021	
Gender														
Male	50.1	65.9	64.5	69.1	72.8	70.1	60.8	67.0	55.6	60.7	60.0	60.8	61.3	-6
Female	43.3	61.7	62.0	65.8	69.8	69.6	61.2	66.9	57.3	60.8	59.8	59.2	64.9	-2
Age														
Under 30	59.1	71.3	70.0	72.3	80.0	81.1	67.6	71.7	69.0	64.6	65.2	60.9	67.4	-4
30–55	44.2	64.8	62.5	67.9	72.6	71.2	61.8	67.5	56.2	62.5	60.9	64.4	65.5	-2
Over 55	37.4	54.8	58.3	62.1	65.2	63.3	57.4	64.3	51.9	56.9	56.5	54.1	59.1	-5
Education														
Secondary and incomplete secondary	41.7	58.4	57.4	57.2	64.8	63.2	56.1	63.1	51.7	56.9	52.6	56.2	56.9	-6
Secondary vocational	46.4	64.6	63.6	66.7	72.2	72.7	63.5	69.0	59.1	63.5	62.5	60.9	64.3	-5
Higher and incomplete higher	53.3	68.6	68.3	77.0	76.8	73.4	63.3	68.6	58.6	61.4	64.6	62.7	68.7	0
Income groups														
Bottom 20%	28.4	51.6	45.3	51.5	57.3	53.2	43.4	48.4	40.4	46.0	38.9	44.3	49.8	+1
Middle 60%	45.5	62.9	65.3	68.7	71.9	71.4	62.6	68.4	56.6	61.9	63.3	60.1	65.8	-3
Top 20%	64.6	74.9	75.3	81.1	82.9	81.8	75.6	79.1	76.4	70.6	76.3	76.0	70.8	-8
Territories														
Vologda	49.2	63.1	67.1	73.6	71.0	68.6	60.9	66.9	57.0	61.0	58.7	55.8	57.0	-10
Cherepovets	50.8	68.1	71.2	76.2	75.8	71.2	60.4	67.3	54.4	59.3	60.7	64.4	68.1	+1
Districts	42.2	61.6	57.1	59.8	68.7	69.8	61.4	66.8	57.5	61.4	60.0	59.7	64.0	-3
Oblast	46.2	63.6	63.1	67.3	71.2	69.9	61.0	66.9	56.5	60.7	59.9	59.9	63.3	-4

CONCLUSIONS

The results of another public opinion monitoring "wave" of VolRC RAS show several multidirectional changes in the dynamics of public opinion over the past two months.

On the one hand, the indicators of social well-being of the population have improved:

- ✓ **share of positive assessments of social mood in the region as a whole increased by 3 p. p. (from 60 to 63%). At the same time, positive changes are even more pronounced in certain socio-demographic categories. Thus, the share of positive assessments of social mood among people under the age of 30 (from 61 to 67%) and those who, according to self-assessment of their own income, belong to the group of 60% of middle-income residents of the region increased by 6 p.p. (from 60 to 66%);**
- ✓ **the share of people who believe that "everything is not so bad, and it is possible to live; it is difficult to live, but it is possible to stand it" increased by 4 p. p. (from 70 to 74%).**

On the other hand, some monitoring indicators indicate that during the same period (from February to April 2021), people's self-assessment of the current state and prospects of their financial situation has significantly deteriorated:

- ✓ **thus, the share of residents of the region who believe that the President of the Russian Federation is not successfully coping with the problem of economic recovery and the growth of the population's well-being increased by 2 p. p. (from 61 to 63%);**
- ✓ **throughout virtually all of 2020 and in 2021, a stable proportion of those who subjectively classify themselves as "poor and extremely poor" remains (48-49%, for comparison, the share of "middle-income" people is 40%);**
- ✓ **In April 2021, the Consumer Sentiment Index (CSI) once again decreased (by 2 p.p., from 85 to 83 p.) and reached the lowest value for the entire measurement period. Since 2008, the CSI has remained below 100 points, which indicates the predominance of pessimistic forecasts in people's assessment of the future of the economy and their personal financial situation. Moreover, the pessimism of the population is increasing, as evidenced by the deteriorating dynamics of the CSI as in the annual dynamics (in 2019, the CSI was 91 p.p., in 2020 – 87 p.), and in the short-term retrospective (in February 2020, the CSI was 91 p., in April 2021 – 83 p.).**

A number of non-material factors prevent the deterioration of social mood assessments:

- ✓ **continued vaccination of the population and, as a result, a decrease in the number of diseases and deaths from coronavirus (while there is a "third wave" of the epidemic in several European countries);**
- ✓ **Russia's position in international political relations is quite clear, resolute, and it reflects the national interests of the country (which significantly worsened after Biden's victory in the US presidential election and the subsequent escalation of the conflict in Ukraine);**
- ✓ **the seasonal factor is also important since the onset of spring traditionally has a positive effect on the assessment of emotional well-being. This is largely why, for the entire measurement period in February – April, there was never a deterioration in social mood, while an increase in positive ratings by 3-4 or more percentage points is a quite common phenomenon: such changes, for example, were observed in the periods 1999–2003, 2007–2008, 2011, 2014–2016, 2018.**

At the same time, the presence of sufficiently significant non-material factors that prevent a sharp deterioration in the assessment of social well-being is in some sense compensated by the most vulnerable

aspects that determine the nature of public sentiment, namely, issues related to the level and quality of life, which significantly worsened in 2020 – 2021 due to the coronavirus pandemic.

Perhaps that is why there are no significant positive changes in the dynamics of the level of approval of the activities of federal and regional authorities, despite the fact that the state continues to actively take measures to support socially vulnerable groups in difficult conditions of overcoming the consequences of the epidemiological crisis.

Another Presidential Address to the Federal Assembly of the Russian Federation, held on April 21, 2021, was devoted to issues of internal development. In particular, to maintaining the level and quality of people's life in the post-crisis period. The President voiced specific instructions to the government and the heads of the constituent entities of the Russian Federation, announced a number of measures of direct financial support to certain categories of population, which, of course, will be enthusiastically received by a significant part of Russian society.

How effectively the decisions of the President will be implemented is an ambiguous question, and, at the same time, it becomes particularly important in the context of the increasing tension in the international political situation, mass protest actions that continue to be organized by the non-systemic opposition, as well as the upcoming elections to the State Duma of the Russian Federation (September 2021).

Perhaps, on this background, the question of the effectiveness of the implementation of the President's clear and specific instructions, as always, acquires the status of a factor of national security, since the absence of tangible changes in this direction for most population will automatically mean an aggravation

Materials were prepared by M.V. Morev, I.M. Bakhvalova, E.E. Leonidova

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Right – 1 cm, others – 2 cm.

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Font size of the article's text – 14, type – Times New Roman (in case a special type font is needed, when typing Greek, Arab, etc. words, Windows default fonts are to be used). In case the paper contains seldom used fonts, they (font family) are to be submitted along with the file. Line interval – 1,5.

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The abstract contains from 200 to 250 words. The abstract states the purpose of the research, points out its undoubted scientific novelty and its differences from similar works of other scientists; contains the methods used by the author and the main results of the work performed; identifies areas of application of the results of the study; briefly formulates the prospects for further research in this area.

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There should be not more than eight words or word combinations. Key words should reflect the content of the manuscript to the fullest extent. The number of words within a phrase should not exceed three.

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The caption of the table and its number (if present) are given in normal font, without highlighting. The caption runs in bold and is center aligned.

Tables are inserted; drawing tools and AutoShapes are not allowed; column and cell alignment using spaces or tabs is not allowed. MS WORD table editor is used for tables. Each piece of data of the stub and head of the table correspond to discrete cell. Only editor standard tools are applied for creating and formatting tables, no pilcrows, spaces and extra blank lines for semantic breakdown and line adjustment are allowed.

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[1] Information about the modified Harvard standard is given in the book: Kirillova O.V. *Redaktsionnaya podgotovka nauchnykh zhurnalov po mezhdunarodnym standartam: rekomendatsii eksperta BD Scopus* [Editorial Preparation of Scientific Journals according to International Standards: Recommendations of a Scopus Expert]. Moscow, 2013. Part 1. 90 p.

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