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ECONOMIC AND SOCIAL CHANGES: FACTS, TRENDS, FORECAST

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

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

Founder: Vologda Research Center of the Russian Academy of Sciences

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

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

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

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

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

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

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

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

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

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

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

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

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EDITORIAL

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"Intellectual Feebleness"[1] of the Ruling Elites and the "Deep People" of the "Long State"

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Abstract. In 2018, Russian society faced a contradiction, caused by the discrepancy between the official political rhetoric and the real actions of the Government. Instead of the priorities stated in the President's Address to the Federal Assembly and in the "May decree" (reducing poverty twofold, Russia's joining the top five economies of the world, etc.), the society was faced with the need to take a "bitter medicine" in the form of raising the retirement age. Moreover, the news about the changes in pension legislation reached the general public just after the inauguration of the President (the inauguration took place on May 7, 2018, and the draft law on the pension reform was submitted to the State Duma on June 16). The initial reaction to the pension reform was adamantly negative: according to the surveys conducted by the Public Opinion Foundation, almost 80% of Russians were against the reform. Over the following months, a wave of protests swept across the country and stopped only after Vladimir Putin made an official appeal to the Russian people on August 29 and explained that the pension system has to be reformed;

[1] Noskovich O.I. How to build a long state? *Nezavisimaya Gazeta,* 2019. March, 18th. Available at: http://www.ng.ru/ideas/2019-03-18/7_7533_ideas1.html

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he proposed some adjustments that would soften some conditions of the reform for certain population groups. However, despite the fact that the visible signs of public discontent (protests, critical articles, etc.) are gradually fading, the level of people's support for the authorities, including the President of the Russian Federation, continued to decline; fundamental changes began to take place in the public consciousness, and such changes are of a long-term nature. This fact proves that the pension reform only triggered a more profound internal discontent that has been accumulating over the last years. Thus, at the beginning of 2019, the fundamental question concerning the legitimacy of power in Russia became one of the most pressing and urgent for society and authorities with regard to actual implementation of the tasks set out in the "May Decree", qualitative growth of the standard of living and, by and large, preservation of the Russian statehood. A deep and ideologically saturated article of V. Putin's personal adviser V. Surkov, which was published in February 2019, addresses this very issue (as some experts think), and it has caused a wide resonance in the academic, political and social environment. The following materials present our views on Surkov's article and on a significant set of issues raised in it. The conclusions we come to are supported not only by the results of our own studies of the long-term dynamics of public opinion, but also by expert assessments, which largely reflect the real situation in the country.

Key words: "long state", "deep people", public opinion, public administration efficiency, President.

I. Main theses and key concepts of V. Surkov's theory of the "long state".

The terms "long state" and "deep people" were coined by V. Surkov, Assistant to the President. In March 2019, his article entitled *V. Putin's Long State* was published, which presented an attempt to build an ideological concept of the policy of the incumbent President and virtually the entire post-Soviet Russia.

The publication gained wide resonance in political, public and journalistic circles and even got a response from the Kremlin. Dmitry Peskov, Press Secretary for the President, giave the following commentary to Surkov's publication: *"The article is quite complex and requires reflection. It contains a personal approach and provides a personal worldview... Probably, it is needless to say that the article will be interesting to many, and that it is very informative and deep. Everything else can and probably should be discussed"*[2].

So what do the notions of "long state" and "deep people" mean?

Against the background of the heated discussions caused by the approach of 2024, when V. Putin cannot be re-elected President of Russia under the current Constitution, the fears of many experts about the fate of the country in the broadest sense of the word are exacerbated.

> **Putin owns the political present of Russia, but he will have no influence on the future, which will come immediately after him.** The situation was the same with Gorbachev and Yeltsin. Their successors conducted a completely different course, regardless of what their predecessors had done. Granted, something passed from era to era through institutional inertia, but the main vector changed radically. **Putin's truth is that his control does not extend to the future ...** he has not created any special political model; he has only corrected the most monstrous forms of pro-Western liberal democracy that was established in the 1990s against the will of the people. That is, politically, we still have the same **liberal paradigm** tamed by an authoritarian ruler with personal patriotic and vaguely conservative sympathies. This is not enough for a new political model.
>
> **Without Putin, the elite and the government as a whole will be completely illegitimate, as they were under Yeltsin.** At the same time, for all these years, no structures which would reflect the views of the people were created[3].

[2] News of the business portal "Business.FM". 2019. February 11. Available at: https://www.bfm.ru/news/406623

[3] Dugin A. Putin or Super-Putin. *Official website of the Izborsk Club*. 2019. February 12. Available at: https://izborsk-club.ru/16492

> Putin's big political machine is only sarting to gain momentum and is preparing to a long, difficult and interesting work. Its output at full capacity is far ahead, so that in many years Russia will still be Putin's state, just as modern France still calls itself the Fifth Republic of de Gaulle, Turkey (despite the fact that antiKemalists are now at the helm there) is still based on The Six Arrows ideology of Atatürk, and the United States still turn to the images and values of the semi-legendary Founding Fathers[4].

The "long state" model by Vladislav Surkov suggests that "Russia in the era of V. Putin's rule is "a state of a new type, which we have not yet had. Having formed as a whole to the mid-2000s, it is still studied insufficiently, but its originality and viability are obvious. The stress tests, which it has passed and is now taking, show that it is this organically developed model of political system that will be an effective means of survival and elevation of the Russian nation not only in the coming years, but also decades, and most likely in the entire coming century..."[5] **This is the "long state" – a state that has just begun to form and will not end with the departure of Putin from the political Olympus of the country.** Surkov, as some experts note, "voiced a fundamental thing: even in the absence of its boss, "Putinism" as an ideology, as an emanation of the supreme spirit, will remain for a long time. Even when the new President comes"[6].

"Deep people" is a more complex concept and it probably requires certain mental qualities for its understanding. V. Surkov writes: "The elite shines on a glossy surface; century after century it actively (let us face it) involves the people in some actions – party meetings, wars, elections, economic experiments. People participate in the activities, but somewhat aloof, they do not rise to the surface, but live a very different life in their own depth. The two national lives – surface and deep – are sometimes lived in opposite directions, sometimes in coinciding ones, but they never merge into one"[7].

> The deep people always have their own agenda, they are inaccessible to opinion polls, agitation, threats and other methods of direct study and influence. The understanding of who they are, what they think and what they want often comes suddenly and late, and not to those who can do something... With their giant supermass, the deep people create an irresistible force of cultural gravity, which connects the nation and attracts (presses) the elite to the earth (to its native land), the elte that from time to time tries to soar with cosmopolitan views[8].

The "depth" of the Russian people, thus, is its mental feature, allowing the country as a whole to pass successfully a variety of "stress tests" and be guided not so much by logic and common sense, as by cultural and historical features that have developed over the centuries of existence of the Russian state. This is not understood by the "Western man", but this is where the advantage of Russia lies, it will provide Russia with a bright future, despite any threats, sanctions and other conditions created by our "foreign partners".

The easiest way to show the real effect of the "depth" of the Russian people is to provide concrete examples. "Deep people" for example, can live for decades in conditions of such a level of social inequality, in which a social explosion would have occurred in Western society long ago. And they not just live in such cindotions, but sincerely show consolidated support to the current political course and specific people implementing it; they provide the ruling party with a constitutional majority in the State Duma, and the head of state – with unprecedented support at presidential elections.

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

[5] *Ibidem.*

[6] Assistant to the President of Russia proclaimed the era of Putinism (interview with M. Delyagin). *Argumenty nedeli,* 2019, no. 7 (651), February 21.

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

[8] *Ibidem.*

According to the Federal State Statistics Service, the ratio of the richest 10% to the poorest 10% (R/P 10%) in Russia is 16.

According to experts, eight is the critical value of R/P 10%[9], the achievement of which indicates "a high level of risks in the functioning of social relations, the threat of transition to a state of increased instability, poor predictability and, consequently, the need for swift intervention of the authorities to alter the dangerous trends"[10].

According to the UN recommendations, this indicator should not exceed 8–10, "otherwise the situation in a democratic country is fraught with social cataclysms"[11].

"Deep people" – it is when a long-term and unrealized need to improve the standard of living and quality of life suddenly gives way to euphoria from the return of Crimea and Sevastopol to its native Harbor.

It is a society that does not remember the promises of the current government, does not try to remember them and does not try to analyze the effectiveness of their implementation, drawing appropriate conclusions and posing relevant questions before the head of state. Instead, from year to year, the "deep people" perceive and sincerely support new and even more ambitious tasks for the near future, even if they are to be implemented by the same team of officials.

These are people who are sincerely happy that the President, delivering his Address to the Federal Assembly, draws the attention of the Government to the incorrect indexation of pensions; the "deep people" realize that now this injustice will be eliminated and no longer wonder how this was possible at all.

The "deep people" enthusiastically perceive the arrest of another embezzled official and do not ask questions about how he managed to accumulate his multi-billion dollar fortune, who put him in this position and where his confiscated funds went. Even if this official is the Minister of Economic Development.

Finally, the "depth" of the Russian people allows the authorities to communicate with them through the media in the language of global "mega-concepts" such as Nord Stream, Kerch Strait Bridge, Leaders of Russia, ultra-modern thermonuclear reactors, etc., ignoring the problems that concern people in the first place: poverty, inequality, injustice, social insecurity, etc.

We can provide a lot of examples of the "deep people" in action. **The fact is that it is this mental feature of Russian society that acts as the foundation cementing the entire system of V. Putin's "long state". And (according To V. Surkov's viewpoint) this foundation is much stronger than Western pragmatism, individualism and financial and legal literacy combined.**

In V. Surkov's concept there is one more moment which is necessary to understand "on the shore". The "long state" is a kind of system in which three types of subjects are closely interconnected – the President, the elite and society (the "deep people"). Each of them performs its role and is an important part of the "long state", and each of them by its very existence ensures the long-term (and even centuries-old) continuity of functioning of the state. The elite does it as well. Here is how V. Surkov himself writes about the role of all three subjects.

1. The elite. "In the new system, all institutions are subordinated to the main task – trustworthy communication and interaction of the supreme ruler with the citizens. The various branches of government converge on the personality of the leader, and they are valuable only to the extent that they provide a link with him. Besides them, there are informal ways of communication that bypass formal structures and elite groups. And when the stupidity, backwardness or corruption create a

[9] Glaz'ev S.Yu., Lokosov V.V. Assessment of critical threshold values of indicators of the state of Russian society and their use in the management of socio-economic development. *Vestnik RAN*, 2012, vol. 82, no. 7, pp. 587-614.

[10] Lokosov V.V. The method of critical threshold indicators and the evaluation of human potential. *Ekonomika. Nalogi. Pravo,* 2012, no. 5, p. 75.

[11] Kalabekov I.G. Russian reforms in facts and figures. Available at: http://refru.ru/income16.pdf

disturbance in the lines of communication with the people, then certain vigorous measures are taken to restore the audibility".

2. The President. "The ability to hear and understand the people, to see through them to the fullest depths and to act accordingly is a unique and major advantage of Putin's state. It is in conformity with the people, and therefore it is not subject to destructive overloads from the counter currents of history. Therefore, it is effective and durable".

3. The "deep people". "Society trusts only the top official of the state... The modern model of the Russian state begins with trust and is based on trust. It is Russia's fundamental difference from the Western model, which cultivates distrust and criticism. And it is Russia's strength".

Thus, according to V. Surkov's concept of the "long state", the ruling elites are given a significant place in the system of government: people's growing irritation toward the elites is automatically translated into the growth of trust in the President, and this becomes the foundation of the sacred relationship between society and the head of state, which ultimately ensures the uniqueness and durability of the new Russian state built by V. Putin.

This is how (in general terms) V. Putin's "long state" functions. Let us note that V. Surkov's theory has immediately found supporters and opponents.

Some experts found **"a sign of maturing Russian political thought"**[12] in the article. They say that V. Surkov "describes the basic principles of the current Russian state quite thoroughly"[13] and that his theory is one of the few (and, most importantly, very timely) attempts at a deep philosophical understanding of what Putin's Russia is: what it relies on, where it is moving and what competitive advantages will ensure its prosperity in the near future.

> Vladislav Surkov's article "Putin's Long State" clearly highlights the main problem of modern Russian society and the Russian state; this problem is that we don't know what we are building... Is Putin's state in its present form able to carry out pressing historic transformations?[14].

Others believe that the theory of V. Surkov, who "claims to be Putin's major PR ideologist"[15] and who put forward the concept of "sovereign democracy", is nothing more than an attempt to explain the rapidly falling ratings of the government due to the adoption of the pension reform[16]; including the falling rating of the President whose level of approval in mid-June 2018 fell from 77 to 62% and since then has been fluctuating in the range of 62–65%[17].

> I think that in Surkov's article the main message is sincere and it reflects the will of the current elites to preserve themselves and to preserve the current regime in the post-Putin period as well. To prevent Putin from unexpectedly deciding to change anything on his own at the end of his presidency, they soothe him: everything is already perfect. But sincerity does not mean truth. The solipsism of the ruling elite still cannot replace history and political logic. Therefore, Surkov's analysis of the current political regime in modern Russia is entirely **false** in its very foundations[18].

It is still unknown whether this attempt will be successful, but we cannot but admit that V. Surkov's theory contains a "rational kernel" that explains why one cannot understand Russia with the mind

[12] Voevodina T. Peoples have no power in their institutions. *Gazeta "Zavtra"*, 2019, February 17. Available at: http://zavtra.ru/blogs/narodi_ne_vlastni_v_svoih_uchrezhdeniyah

[13] Noskovich O.I. How to build a long state? *Nezavisimaya gazeta,* 2019, March 18. Available at: http://www.ng.ru/ideas/2019-03-18/7_7533_ideas1.html

[14] Noskovich O.I. How to build a long state? *Nezavisimaya gazeta,* 2019, March 18. Available at: http://www.ng.ru/ideas/2019-03-18/7_7533_ideas1.html

[15] Dugin A. Putin or Super-Putin. *Official website of the Izborsk Club*. 2019. February 12. Available at: https://izborsk-club.ru/16492

[16] Uglanov A. What is on the mind of the deep people? *Argumenty nedeli,* 2019, no. 6 (650), February 14.

[17] VTsIOM data. Available at: https://wciom.ru/news/ratings/odobrenie_deyatelnosti_gosudarstvennyx_institutov/

[18] Dugin A. Putin or Super-Putin. *Official website of the Izborsk Club*. 2019. February 12. Available at: https://izborsk-club.ru/16492

alone, as the Russian poet and statesman Fyodor Tyutchev wrote in his short philosophical poem: "Who would grasp Russia with the mind? For her no yardstick was created" [Translated by John Dewey. *Translator's note*]; it was true in the 19th century and is still relevant today, in the 21st century.

II. The results of the 2018 – the doubts concerning the "long state".

Many experts in different years pointed out that with the unchanged political course and without making tough decisions on the part of the President, Russia is inevitably moving toward "degradation and a large-scale revolutionary crisis"[19]. However, it did not happen, is not happening and (according to V. Surkov's concept) will not happen. Even the pension reform, which affected almost all residents of our country, although its adoption was accompanied by a number of mass demonstrations organized by the non-systemic opposition, by September 2018 became something routine[20] and today the majority of Russians regard it as an objective condition in which they will have to live.

Nevertheless, some of the key changes taking place in the public consciousness of Russians make us doubt that the "depth" of the Russian people and their sacred connection with the national leader will be enough to ensure the prosperity of the "long state" for many decades to come.

The catalyst for these changes were the events of the "Crimean spring" and (what is important) a new round of the economic crisis that Russia faced in early 2015. The crisis caused by economic sanctions was, of course, not as tangible as the crisis of 1991 and even 2008. However, the irony lies in the fact that people faced the crisis while experiencing the "Crimean euphoria": the feeling that "Russia is entering into a new bright and life-affirming century"[21], faced with the need to once again "tighten the belt" and wait for better times.

It is at this moment that the trend of the need for change is emerging in Russian society, and this need has acquired a long-term nature for the first time during the entire period of V. Putin's rule *(Fig. 1)*.

Scientists note that today's stability of Russia's political and economic situation, which V. Putin's team achieved with such difficulty in the early 2000s and which has always been valued by the "deep people" who survived the hardest period of the "turbulent" 1990s is perceived by them as "conservation of stagnation and crisis phenomena"[22]. "In Russia, there is a growing understanding that *without a serious reassessment of the strategies and priorities that proved their worth in the past decade that was relatively successful, the country is unlikely to be able to move forward effectively"*[23]. It is not surprising that the course

> It is up to us to decide how effectively we will be able to use the enormous opportunities of the technological revolution and how we will respond to its challenge. In this sense, the coming years will be decisive for the future of the country. I emphasize this: they will be decisive…
>
> The speed of technological change is growing rapidly and is increasing sharply. Whoever uses this technological wave will get far ahead. This wave will just overwhelm and drown those who can't do it. Technological backwardness and dependence mean a decrease in the security and economic opportunities of the country, and as a result – the loss of sovereignty. This is exactly the case, and not otherwise[24].

[19] Sulakshin S.S. *Is Russia Waiting for a Revolution? Issues of Transition to the Post-Liberal Model of Russia (Algorithm and Scenarios)*. Moscow: Nauka i politika, 2016. P. 683.

[20] *Trust ratings of politicians, ratings of approval of the work of state institutions, ratings of the parties: VTsIOM press release,* 2018, no. 3788, October 12. Available at: https://wciom.ru/index.php?id=236&uid=9363 (comment by M. Mamonov, head of the practice of political analysis and consulting of the research department).

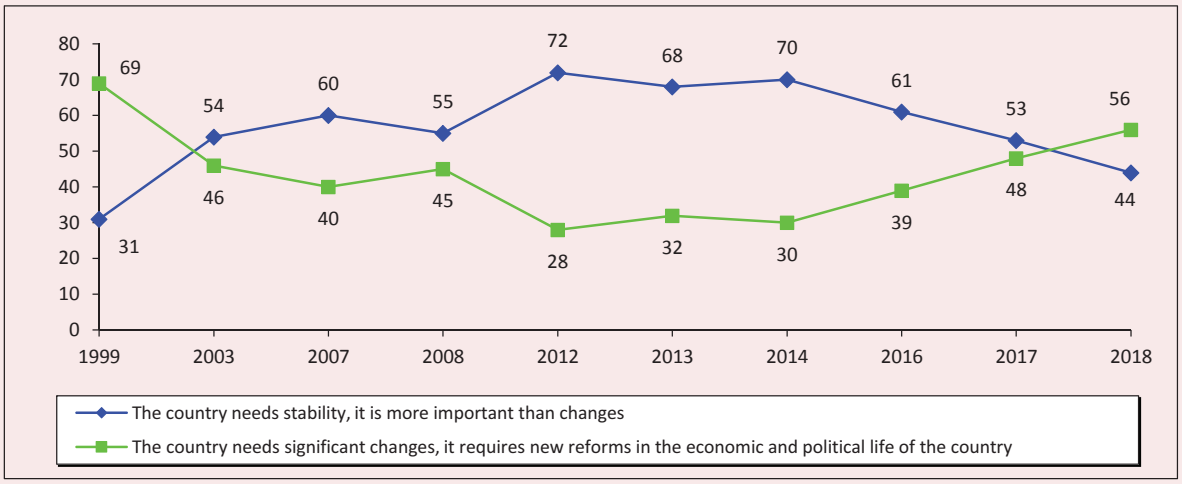
[21] Osipov G.V. We should not miss the chance we have been given! In: *Sociology and Economics of Modern Social Reality. Social and Socio-Political Situation in Russia in 2013.* Moscow: ISPI RAN, 2013. P. 17.

[22] Petukhov V.V. Dynamics of social sentiment of Russians and the formation of request for changes. *Sotsis*, 2018, no. 11, p. 43.

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

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

Figure 1. Dynamics of the orientation of Russians toward stability and change (% of respondents)



Source: *Russian Society after the 2018 Presidential Election: a Request for Change: Information and Analytical Summary*. FRSC RAS. Moscow, 2018. P. 7.

Table 1. On March 1, 2018, Russian President Vladimir Putin delivered his annual Address to the Federal Assembly. In your opinion, how realistic are the tasks that the President voiced in it, and will they be fulfilled or not? (closed-ended question, one answer, % of those who listened to the Address or learned about its content from the news)

Answer	2009	2010	2011	2012	2013	2014	2018
The President announced specific and real tasks and, most likely, they will be fulfilled as soon as possible	28	31	31	36	29	49	34
The President announced specific and real tasks, but they will not be fulfilled due to corruption and bureaucracy in power	49	47	40	42	46	31	47
The President's proposals are too general, vague and impossible to implement	11	12	17	16	20	8	6
Difficult to answer	12	10	12	6	5	12	13

announced by the President in March 2018 and aimed at the "breakthrough development" of the domestic situation in the country (not just as a new vector of state policy until 2024, but a necessary condition for survival in the rapidly developing world) found support in the broad strata of Russian society and provided V. Putin with a record number of votes.

Thus, reasoning in line with V. Surkov's concept, we can say that for many years the "deep people" were nourishing the need for a change, and this need went through the channels of sacred communication and found its embodiment at the "top", in the President's Address to the Federal Assembly, and was communicated as an order to the elites in the form of the "May decree" and national projects.

Seventy eight percent of Russians (a record number for the entire period from 2009 to 2018) noted that the President in his Address "announced concrete and real tasks". However, most of them (47%) considered that these tasks "will not be fulfilled", and it is "because of corruption and bureaucracy in the government" *(Tab. 1)*.

By and large, the President himself said that the country was facing "very difficult tasks" and for their implementation it would be necessary "to make long overdue, difficult, but extremely necessary decisions", "to use all resources, to

gather all the strength, to show the will for bold and productive work"[25].

> ...As it was in the 1990s in our modern history: a huge number of regulations were adopted that were like music to common people's ears, and we can say with confidence that more than half of them were not executed and could not be executed due to the very difficult financial and economic situation in the country. What did that mean? People were deceived, it was just a hoax. The authorities passed the laws knowing that they would never be implemented, and they introduced a huge number of benefits, realizing that the budget is not able to implement these decisions. We can never go back to this practice[26].

Moreover, a year later at a meeting of the Board of the Prosecutor General's office, the President once again confirmed his intentions, stressing that in any case it is impossible to return to the practice of the 1990s, when the government took "a huge number of useful decisions", knowing in advance that it is impossible to implement them; it is "cheating people, just cheating and nothing else".

However, ironically, it is not the isolated cases, but the current **practice** when the Government does not execute direct orders of the head of state is an attribute of "oligarchic capitalism" that exists in the current political system of the "long state". This practice was the reason for the failure to comply with the May 2012 decrees *(Insert 1)*: "there still remain some points that have not been executed"[27], as the President put it very mildly; or frankly speaking, according to experts, they were "safely forgotten"[28].

The same practice formed the basis for the incorrect indexation of pensions in 2019, to which the President pointed out quite clearly: "It was necessary to take into account all the nuances but this was left undone, and of course, this should not be allowed to happen. This injustice, and it is certainly an injustice, should be sorted immediately"[29].

The first signal indicating that the May 2018 Decree and the election promises of the President (and with them the hopes of the "deep people") will be once again sabotaged, consisted in superficial reshuffling of the Government, which actually means that the implementation of the "decisive breakthrough", which Russians need so badly, will be entrusted to the same team that could not solve this problem over the previous 18 years.

> It is not very clear what is the point in starting new "May decrees" when the previous ones have not yet been implemented. Moreover, **the implementation of the previous "May decrees" over the past 5.5 years gives the impression of brazen and cynical sabotage.** It got to the point that the Government stated that it did not have one trillion rubles for the implementation of the "May decrees" in the same year when the unused balances in the accounts of the federal budget, that is, the budget reserve of the same Government, increased by one and a half trillion rubles, that is 1.5 times the required amount. So the very idea of the President's "May decrees" is compromised, on the one hand, by the Medvedev government, and on the other hand – by the humanism of the President, who tolerates all this[30].

The final doubts were dispelled by the pension reform, which people learned about in June 2018. As experts note, it became a turning point for society, because it brought to the end what the reform of monetization of benefits could not bring.

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

[26] Transctipt of the meeting of the Board of the Prosecutor General's office, March 19, 2019. *Official website of the RF President*. Available at:http://www.kremlin.ru/events/president/transcripts/60100

[27] *Ibidem*.

[28] It will cost 5 thousand rubles to obtain an international passport: why is it so expensive? *Moskovskii komsomolets*, 2018, June 19. Available at: http://www.mk.ru/social/2018/06/19/oformlenie-zagranpasporta-oboydetsya-v-5-tysyach-rubley-pochemu-tak-dorogo.html

[29] Presidential Address to the Federal Assembly of the Russian Federation, February 20, 2019. *Official website of the RF President*. Available at: http://www.kremlin.ru/events/president/news/59863

[30] Polovnikov A. New "May decrees": does all the future exist in the past? (interview with M. Delyagin). *Portal "Nakanune.ru"*, 2018, February 26. Available at: https://www.nakanune.ru/articles/113723/

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Insert 1

Information on achievement of indicators on some orders established in the "May decrees" of the Russian President [31]

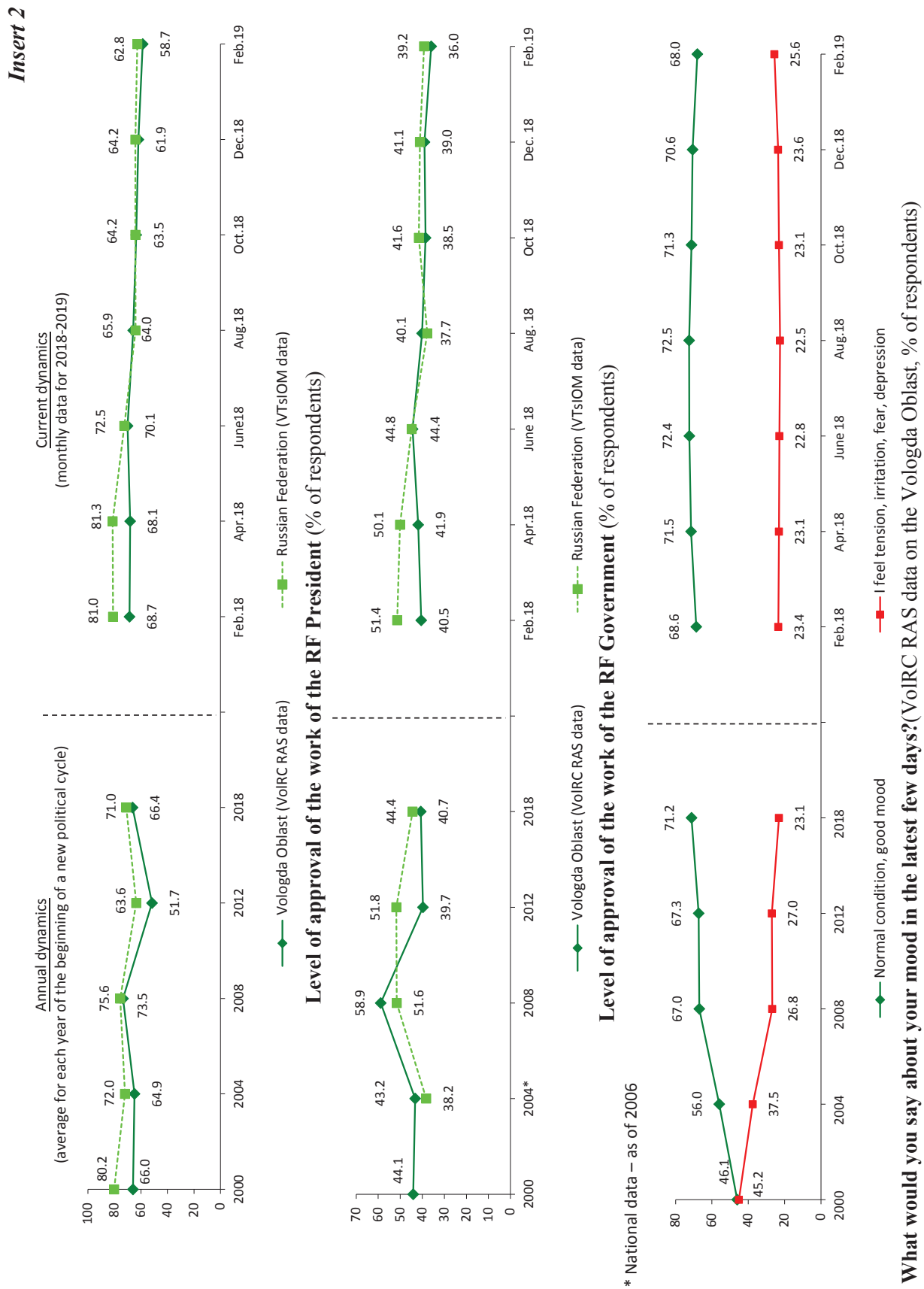
Source	President's order	Fact*	deviation
Presidential Decree of May 7, 2012 No. 596 "On long-term state economic policy"	"Improving the position of the Russian Federation in the World Bank's Doing Business ranking from 120th in 2011 to 50th in 2015 and 20th in 2018"	35th place** (2018)	-15 units
	"Increasing the share of high-tech and science-intensive industries in gross domestic product by 2018 in 1.3 times compared to the level of 2011"	22.1% (2017)***	-3.5%
	"Creating and upgrading 25 million high-performance jobs by 2020"	15,983.279 thousand units (2016)	-9.02 million
Presidential Decree of May 7, 2012 No. 597 "On measures to implement state social policy"	"Raising real wages in 1.4–1.5 times by 2018"	100.8% (2016)****	-56%
Presidential Decree of May 7, 2012 No. 598 "On improvement of state policy in the field of healthcare"	"Reducing mortality from neoplasms (including malignant neoplasms) to 192.8 cases per 100 thousand population"	196.9 per 100 thousand population (2017)	-4.1 per 100 thousand population
	"Reducing mortality from road accidents to 10.6 cases per 100 thousand population"	13.6 per 100 thousand population (2017)	-3 per 100 thousand population
Presidential Decree of May 7, 2012 No. 599 "On the measures to implement state policy in the field of education and science"	"Increasing expenditures on domestic research and development up to 1.77% of gross domestic product by 2015"	1.10% (2016)	-0.67%
Presidential Decree of May 7, 2012 No. 600 "On the measures to provide citizens of the Russian Federation with affordable and comfortable housing and to improve the quality of housing and utilities services"	"Until 2020 – providing affordable and comfortable housing to 60% of Russian families in need of improving their living conditions"	5% (2016)	-55%
Presidential Decree of May 7, 2012 No. 606 "On the measures to implement the demographic policy of the Russian Federation"	"To ensure an increase in life expectancy in the Russian Federation to 74 years by 2018"	72.7 years (2017)	-1.3 years

* Data of the Federal State Statistics Service. Available at: www.gks.ru.
** Source: Doing Business 2018. The World Bank has published a ranking of countries on the ease of doing business. Available at:: http://novorusmir.ru/archives/31784
*** In 2011, the share of high-tech and science-intensive industries in gross domestic product was 19.7%. According to the President's instruction, it is necessary to reach the level of 25.6% by 2018.
**** In 2012, the real accrued wage was 108.4% compared to the previous year.
According to Rosstat, for 2016–2017, many of the President's instructions contained in the May 2012 decrees remain unfulfilled, and this applies to a variety of areas: economy, science, demography, standard of living and quality of life. In the Address to the Federal Assembly in 2018 the President mentioned that during the implementation of the May decrees "some orders were not executed to the fullest extent", but they are quite enough to arouse the suspicion of experts: "The work on Correction of mistakes that was not carried out makes you think what of the current bulk of plans is difficult to implement, what got into the text in a hurry or in the hope that the people have a short memory?"[32].

[31] Ilyin V.A., Morev M.V. "Russian Federation – a welfare state?": assessing the results of 25 years of implementation of Article 7 of the Russian Constitution. *Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz,* 2018, vol. 11, no. 6, p. 20.

[32] Komrakov A. Sociologists evaluated the reaction of the population to Vladimir Putin's promises. *Nezavisimaya gazeta*, 2018, March 14. Available at: http://www.ng.ru/economics/2018-03-14/4_7189_putin.html

Insert 2


Annual dynamics
(average for each year of the beginning of a new political cycle)
Current dynamics
(monthly data for 2018-2019)
Vologda Oblast (VolRC RAS data)
Russian Federation (VTsIOM data)
Level of approval of the work of the RF President (% of respondents)
Level of approval of the work of the RF Government (% of respondents)
* National data – as of 2006
Normal condition, good mood
I feel tension, irritation, fear, depression
What would you say about your mood in the latest few days?(VolRC RAS data on the Vologda Oblast, % of respondents)

From that moment, according to opinion polls, the pre-election enthusiasm in society vanished and was replaced by falling ratings of the authorities and deterioration of social mood. And if the position of the President was in some way saved by his August address to the people that was broadcast on federal television channels, with explanations and adjustments of the pension reform (it is no coincidence that since September 2018 the rate of decline in support of the President somewhat slowed down, although it is still premature to talk about the return of the positive trend), then the assessment of the work of the Government continues to fall *(Insert 2)*.

If we turn to the monetization of benefits that took place in 2005, then we see that the surge of protests was not supported by the fundamental factors such as the change in mass consciousness. Therefore, it came to naught in less than a year, and most of the sociological indicators returned to a relatively "calm" track. But now that the unpopular decision of the authorities has played the role of a trigger to activate more fundamental changes, the consequences can stretch for a longer time[33].

Taking into account the fact that Russians no longer believe in their ability to exert at least some influence on the situation in the country[34] and prefer to build their lives "without looking" at what the state is doing[35], "routinization" of the issue of pension reform was inevitable.

...After the announcement of the pension reform, citizens' confidence in the government has seriously shaken, skepticism remains and the situation cannot be quickly corrected with the help of statements... On the other hand, the measurements of ratings before and after the Presidential Address would have made more sense if the ruling elite in Russia lived in conditions of strong political competition. But there is no such competition. Citizens who cease to trust the authorities at the same time are not ready to be included in politics. On the contrary, they want to distance themselves from politics and its procedures, including elections. This can be called the potential for political apathy[36].

However, all that the state has achieved is another round of struggle for the return of the lost trust. It is hardly necessary to talk about the former unity of society and power in the awareness and readiness to implement the goal of breakthrough development today. And it is not just about the pension reform. "The bitter, but necessary medicine" would be accepted by society with much smaller losses if this process was "sweetened" by equally weighty measures, **directly** (instead of once there "long") focused on the solution of the main problems of the population – overcoming of poverty and social inequality. Instead, the Russians see that certain less visible reforms that are nevertheless "draining the wallets" of ordinary citizens are taking place against the background of discussions about the changes in pension legislation. Such reforms are as follows: raising VAT, raising tax on purchases in online stores, "piloting" of taxation of self-employed, raising tariffs for the disposal of solid waste, etc. And this is happening against the

[33] Belanovskii S.A., Dmitriev M.E., Nikol'skaya A.V. Signs of fundamental shifts in the mass consciousness of Russians. *Obshchestvennye nauki i sovremennost',* 2019, no. 1, p. 16.

[34] This is evidenced by the data of international, national and regional studies:

1. Thus, according to the European Social Survey, in 2016, about 74% of Russians believed that they "are not able to personally participate in politics". It is the 13th place among 16 countries of Western Europe. Only 6% of the population held the opposite point of view (for comparison: in Germany, Norway, Switzerland, this figure is 23–25%).

2. According to the VTsIOM, in 2017, 70% of Russians said that they could not influence the situation in their settlement, in thir region, and in the country as a whole; 51% claimed that "Russian citizens do not have the ability to control the work of the authorities or in any way influence the decisions taken by the authorities".

3. According to VolRC RAS, 82% believe that they cannot influence the state of affairs in their region or in the country; 74% – point out the same about the state of affairs in their municipality.

[35] This is evidenced by the increase in the number of "self-sufficient" Russians, whose share for the period from 2011 to 2016 increased from 34 to 48%. At the same time, "self-sufficient" Russians are people who do not need the care from the state or simply do not believe in its effectiveness" (source: Petukhov V.V. Dynamics of social sentiment of Russians and the formation of request for changes. Sotsis, 2018, no. 11, p. 50).

[36] Protest potential or political apathy? (editorial). *Nezavisimaya gazeta,* 2019, March 4. Available at: http://www.ng.ru/editorial/2019-03-04/2_7523_red.html

Table 2. Structure of the most urgent problems that people are concerned about* (% of respondents)

Problem	1999		2000		2007		2012		2018	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Inflation	**54.5**	***2***	**44.7**	***2***	**43.8**	***1***	**55.3**	***1***	**53.7**	***1***
Low standard of living, poverty	**57.1**	***1***	**50.8**	***1***	**40.4**	***2***	**43.2**	***2***	**51.1**	***2***
Stratification of the population on "poor" and "rich"	**21.3**	***9***	**27.7**	***7***	**31.0**	***4***	**37.5**	***3***	**35.9**	***3***
Problem of housing, low affordability of housing	11.8	*14*	16.8	*9*	31.8	*3*	28.6	*4*	23.5	*4*
Political instability	21.9	*8*	16.0	*10*	7.9	*15*	11.2	*16*	23.1	*5*
Economic instability, shut down of enterprises	39.6	*4*	29.1	*6*	14.5	*13*	16.5	*11*	22.5	*6*
Corruption, bribery	14.8	*11*	15.4	*11*	15.0	*12*	19.8	*9*	21.9	*7*
Poor quality of engineering infrastructure (utilities, roads, transport, etc.)	No data	*No data*	No data	*No data*	No data	*No data*	25.3	*7*	20.1	*8*
Social insecurity of citizens	32.5	*6*	34.4	*4*	26.7	*7*	22.3	*8*	19.9	*9*
High crime rate, vulnerability to crime, hooliganism	33.4	*5*	36.9	*3*	30.2	*6*	25.5	*6*	19.0	*10*

* Ranked according to the data for 2018; in total, there are 23 problems in the survey, the table shows the 10 most relevant ones in 2018.
Source: VoIRC RAS public opinion monitoring.

backdrop of an increasingly open demonstration by the authorities of their disdainful (if not derogatory) attitude toward the people...[37]

In December 2018, the Government of the Russian Federation developed national projects – concrete tools for the implementation of the "May Decree" of the President. National projects did not become an exception to the rules, but smoothly continued the line of the Address and the May 2018 decrees: they contain all the same correct messages, ambitious indicators, "blurred" instruments of achievement and the same responsible persons. But the most important thing is that among the 12 national projects, "the main task of which, according to the President, is to achieve real positive changes in the life of every Russian citizen and every family"[38], there was no place for a project to overcome poverty and inequality[39], that is, there was no place for registration of the officially adopted way, plan, mechanism and tool to solve the very problems that people have been concerned about for the last 20 years *(Tab. 2)*.

Moreover, against the background of the deteriorating statistics provided by Rosstat, "the Government more and more often calls for changes in the methods of calculating statistical indicators. These appeals concern indicators that reflect the situation with the most pressing issues such as poverty level and income dynamics"[40]. According to T. Golikova, "in a short period we have to rethink the approaches to poverty assessment, to its measurement and to move to more modern standards"[41]. M. Oreshkin points out that "the decline in people's real disposable incomes is a technical indicator...In fact, incomes are growing;

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

[38] Transcript of V. Putin's speech at the meeting of the Council for Strategic Development and National Projects, October 24, 2018. *Official website of the RF President*. Available at: http://www.kremlin.ru/events/president/news/58894

[39] The fight against poverty is going on, but for some reason not within the national project (editorial). *Nezavisimaya gazeta,* 2019, February 20. Available at: http://www.ng.ru/editorial/2019-02-20/7513_2_red.html

[40] *Ibidem.*

[41] The Government will develop new approaches to poverty assessment (from T. Golikova's speech at the Gaidar Forum 2019). *RIA Novosti*. Available at: https://ria.ru/20190115/1549363040.html

it is a methodological issue"[42]. A. Siluanov notes: "Rosstat is the most important agency that uses outdated technologies and outdated tools. The organization needs serious reform... Real wages, which make up the majority of real incomes of the population, are considered to be more or less clear and reliable. As for the calculation of real incomes of the population, the claims are considerable"[43].

According to Rosstat, for the period after 2013, the number of the poor in Russia increased by about 26%: in 2013, 15.5 million people were below the poverty line, in January–September 2018 – 19.6 million people. **The country "celebrated" the five years of decline in real disposable incomes of citizens** – incomes adjusted for inflation and mandatory payments. According to the updated assessment of the statistics agency, people's incomes in 2018 decreased by 0.3% in annual terms (taking into account the one-time payment from 2017). **Now the sixth year of the impoverishment of the citizens has begun.** In January, according to Rosstat, people's incomes decreased by 1.3% in annual terms[44].

Thus, the first year of the new political cycle has shown that the elites are "intellectually feeble"[45], and this requires "vigorous measures to restore the audibility"[46] between the "deep people" and the President. However, first of all, the continuing and long-term growth in the number of Russians who demand changes suggests that sooner or later this trend will result in something, and this means that even the "deep people" have their limits. Second, whatever theory explains the specifics of the complex and multifactorial relations between the main actors of the "long state", there are objective conditions – the limits to V. Putin's term in office a President and the very "lag" behind the developed countries, which the President spoke about as "the major threat and our main enemy", which will "inevitably increase"[47], if we ignore it.

The first year out of the six years remaining before the presidential election and out of the four years remaining before the elections to the State Duma has passed. Regarding its results, we can use the phrase, with which the experts from RAS Institute of Sociology described the Russian society five years ago: it is "divided into two groups comparable in size"[48]. Only this time, it is divided not by people's attitude toward the present and future of Russia, but by their behavior and actions dictated by the existing conditions of life: those who have personal resources or can count on their immediate environment, joins the ranks of "self-sufficient" Russians, and those who do not have such an opportunity, continue to wait and hope for the moral responsibility of the state and the President. And it is not because now everything has changed and the agenda of the authorities has finally become concrete and aimed at addressing internal problems, but because there is nothing to hope for anymore.

III. The foundation of the "long state".

The historical experience of our country shows that the power based exclusively on the patience of the people, ignoring their needs, inevitably comes to an end and often this end becomes extremely tragic for both of them. In this regard it is hardly possible to say that the sacred connection of the "deep people" with the national leader alone will be enough to ensure the long existence of the state built by V. Putin.

[42] Oreshkin called the decline in people'a real disposable incomes a technical indicator. *Novosti TASS,* 2017, August 21. Available at: https://tass.ru/ekonomika/4496233

[43] Siluanov accused Rosstat that it "makes a terrible account" of real incomes. *Novosti RBK,* 2018, December 24. Available at: https://www.rbc.ru/economics/24/12/2018/5c2118a39a7947e242a659c4

[44] Methodological crisis of the Government (editorial). *Nezavisimaya gazeta,* 2019, March 14. Available at: http://www.ng.ru/editorial/2019-03-14/2_7530_red.html

[45] Noskovich O.I. How to build a long state? *Nezavisimaya gazeta,* 2019, March 18. Available at: http://www.ng.ru/ideas/2019-03-18/7_7533_ideas1.html

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

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

[48] *Russian Society in the Context of New Realities: Information and Analytical Summary.* IS RAS, 2015. P. 3.

One cannot deny the unconditional personal contribution and the historical role of the President due to the fact that he built the framework of a new type of state and managed to protect it from any external effects. To do it, he has to use a "hands-on" approach to the entire state system, and for the time being it was enough to fulfill people's need for stability.

However, today, when the need for stability within the country tends to zero, and society is increasingly responding to specific episodes that prove the inefficiency of public administration; when the factors of the external geopolitical environment force Russia to make a powerful and, most importantly, rapid breakthrough in its development, it becomes more and more clear that the efforts of one person are not enough to respond to these internal and external challenges.

Hence, there is a need to search for new, more fundamental elements of the foundation that can ensure the stability of the Russian statehood established in the 2000s. In our opinion, there are at least two such elements.

The first element consists in the fact that Russia has accumulated significant scientific and philosophical potential, which has always been based on the priority of the goal of preserving and strengthening the Russian statehood both in the external and internal political arena and which at the same time openly and regularly points to the low level of public administration efficiency and offers concrete practical measures to solve this problem (which, however, continues to be ignored by the authorities).

Accidentally (and maybe not), V. Surkov's concept says about the expert community; in the triad "President – elite – "deep people", on which V. Putin's "long state" rests, there is no place for the expert community. This fact is understandable, because academic institutions, according to priority guidelines of scientific and technological development of the Russian Federation, are implementing the "decisive breakthrough" and are "bridging the gap" in the sphere of high technology; therefore, the socio-humanistic science, in line with which it is possible to reflect upon the events and processes taking place in the country, is "on the background".

> In the next 10–15 years, the priorities of science and technology development of the Russian Federation should be those areas that will produce scientific and technnological results and create technologies that are the basis for innovative development of the domestic market of products and services and that can ensure a stable position of Russia in the foreign market, and will provide the following:
>
> a) transition to advanced digital, intelligent manufacturing technologies...
>
> b) transition to environmentally friendly and resource-saving energy...
>
> c) transition to personalized medicine...
>
> d) transition to highly productive and environmentally friendly agriculture and aquafarming...
>
> d) countering anthropogenic, biogenic, social and cultural threats...
>
> e) connectivity of the territory of the Russian Federation through the development of intelligent transport and telecommunications systems...
>
> g) possibility of effective response of the Russian society to big challenges taking into account the interaction between an individual and nature...[49]

In the "long state", the expert opinion that does not coincide with the point of view and actions of the ruling elites can be voiced, but no one listens to it. After all, there is no place for alternative points of view on the implementation of the economic course either at the Gaidar Forum or at the Saint Petersburg Economic Forum...

Meanwhile, it is experts – not only scientists (economists, sociologists), but also politicians, public figures, etc. – point to the vulnerability of the "long state", ask acute but necessary questions and, most importantly, offer strategic directions and concrete actions under which **the "long state" would be based not only on the patience of the "deep people", but also on balanced, scientifically substantiated management decisions aimed at overcoming key problems that people are concerned about *(Insert 3)***.

[49] *Strategy for Scientific and Technological Development of the Russian Federation (approved by the Decree of the President of the Russian Federation from December 1, 2016 No. 642)*. Available at: https://www.garant.ru/products/ipo/prime/doc/71451998/

Insert 3

Some assessments of representatives of the expert community (ranked in chronological order of citation)

Fadeev V.A. Inequality and poverty. Ekspert, 2019, no. 4, pp. 18-22.	'We need a discussion, the purpose of which will be to develop solutions to overcome inequality, improve justice in society and, as a consequence, enter the trajectory of economic development, though it may seem a paradox to orthodox economists who rule in Russia today... Such a national dialogue, which reveals the problems of inequality and injustice, will not stir rebellious sentiments, but on the contrary, will contribute to the creation of an atmosphere of trust in society, trust between the government and society. It will show that the government does not shy away from discussing the most pressing and acute problems, does not try to escape from these problems with the help of propaganda, but is ready to solve them together with society".
Betelin V.V. Russia needs to abandon the "economy of services" and shift to the economy of industrial production. Ekonomist, 2019, no. 2, pp. 3-12.	"In the post-reform Russia, industry produces money for shareholders rather than industrial products...Thus, in the post-reform Russia, the economy of industrial production is replaced by the "economy of services". As a result of liberal economic reforms, systemic prerequisites were created for the formation of a "service economy" in Russia, the essence of which consists not in the production of industrial products, but in the provision of services on its basis, regardless of where and by whom these products are produced. The purpose of the system of the "economy of services" is to train consumers and users of mass industrial products of companies-leaders of global markets, rather than to train personnel for the industry of science and education in Russia... A necessary condition for Russia's joining the five largest economies of the world is to return to the economy of industrial production on the basis of diversification of production at the enterprises of the national military-industrial complex".
Bobkov V.N. Pension reform: simplicity of tactical decisions is fraught with strategic failure. Rossiiskii ekonomicheskii zhurnal, 2019, no. 1, pp. 31–40.	"The whole range of possible alternative solutions aimed at raising the standard of living and improving the quality of life of Russians, related to the transfer of the Russian economy to the trajectory of rapid, sustainable and high-quality growth (which involves the systematic improvement of social and labor relations), has been ignored by the authorities and has not been brought to the public. Simple, "arithmetic" solutions have prevailed: to reduce the number of pension recipients and to increase the number of Pension Fund payers...The adopted legislation on raising the retirement age proceeds from the logic related to the forced inclusion of additional labor resources from among the elderly in the economy, and thus – to the preservation of cheap labor, creation of barriers to productivity growth with a decrease in the standard of living and quality of life. This clearly contradicts the imperative of modern socio-economic progress. If we evaluate the average monthly amount of old-age pension – 20 thousand rubles, which is officially planned to be achieved in 2024, through the prism of criteria of belonging to social groups with different living standards, it becomes obvious that this amount will not allow pensioners to overcome the border of low security. This, of course, is not the milestone that should be set by a state that intends to provide "breakthroughs" in the socio-economic development of the country".
Gubanov S.S. Pension aggravation: what it means and what it will lead to. Ekonomist, 2018, no. 9, p. 24.	"It is useful to recall our historical experience. It convincingly proves that each "comprador" reform, beginning with privatization of property and liberalization of prices, was accompanied by a deafening cannonade of babbling about universal values, freedom and democracy, rapid prosperity and care about people's welfare. In fact, each "reform" was a systemic war of the comprador clan against the people and the country, and it resulted in devastation, poverty, backwardness, loss of social gains, enslavement and mass mortality".
Grinberg R.S. Pension reform as the self-defamation of Russian liberalism. Nezavisimaya gazeta, 2018, September 24. Available at: http://www.ng.ru/scenario/2018-09-24/10_7317_pensii.html	"The taxation of income of individual entrepreneurs is arranged in such a way that after reaching the revenue of 300 thousand rubles. and more, there begins a zone of reducing tax rates, that is, the more you earn, the smaller the share of your income is transferred to the state treasury. And if you manage to earn more than 18 million rubles a year, you will get full exemption from participation in the replenishment of the Pension Fund. In general, as they say, money makes money. But this is the case when, instead of social equalization, there is an increase in the inequality that is already socially dangerous".
Belousov A.R. Speech at the Eastern Economic Forum, Vladivostok (September11-13). RIA Novosti, 2018, September 12. Available at: https://ria.ru/economy/20180912/1528347713.html	"We have created an excellent system in which crooks and criminals feel comfortable. That is, we have created a system of control and supervisory activities, under which the people who are engaged in illegal business, which, in fact, is subject to criminal prosecution, feel more comfortable, nothing can be done to them".

Continuation of Insert 3

Glazyev S.Yu. About the beneficiaries of the economic policy. Website of the Russian Academy of Sciences. 2018. September 6. http://www.ras.ru/digest/showdnews.aspx-?id=14fb2029-3d9e-44e2-972c-8af4f8692eca	"The Central Bank has three main tools of monetary policy: the interest rate, the exchange rate and the volume of money issue. So, the leadership of the Central Bank believed the nonsense of the IMF, which claims that you cannot manage these three tools at the same time... The monetary authorities are held captive by the most absurd dogmas imposed by Washington financial institutions on the national economies in order to deprive them of the possibility of independent development. Guided by these dogmas, our monetary authorities have deprived the economy of credit, without which it cannot develop. Second-year students are taught: the number of control parameters must correspond to the degrees of freedom of control objects. And the Bank of Russia throws the monetary system to the mercy of fate, or rather, gives it into the hands of currency speculators and court bankers".
Obukhova E., Pahunov K., Ivanter A. This is a reform, baby! Ekspert, 2018, no. 26 (1080), June 25.	"The reasons why it is necessary to carry out such a tough time-bound change in the retirement age reform are not yet visible. Our analysis, and we consider it impartial, shows that the economy in this case can not only win nothing, but even lose — due to the growth of spending on preferential types of pensions, unemployment and, most importantly, the potential reduction of the wage fund, which is the basis for the formation of the Pension Fund".
Shirov A.A., Potapenko V.V. About a fair pension system. Ekspert, 2018, no. 24, June11-17.	"There are no reasonable demographic arguments in favor of raising the retirement age for men immediately...Attempts to solve fiscal problems on the basis of changing the parameters of the pension system carry long-term risks, the main of which consists in the undermining of people's trust in the social policy of the state... In general, with the inertial development of the economy, the only way to maintain the growth of the level of real pensions is not just to raise the retirement age, but also to increase the expenditures on pensions in relation to GDP to the levels typical for the countries of Eastern Europe. Elimination of the budget deficit of the Pension Fund of Russia, ceteris paribus, leads to a significant reduction in the standard of living of pensioners and has a negative impact on the growth rate of the economy".
Katasonov V.Yu. "The goats in spectacles" milk mosquitoes. Information portal "Novaya Rossiya". 2018. May 28. Available at: http://russnov.ru/valentin-katasonov-ochkastye-kozly-doyat-komarov-28-05-2018/	"I have an impression that someone is conducting all this performance called "Saint Petersburg International Economic Forum". And everything possible and impossible is done to attract the attention of the audience to behind-the-scenes and sometimes open squabbles. But this is all a pennyworth dispute, by and large. I found no serious discussion either at the forum, or on the Internet about the forum...Oreshkin, Kudrin, Siluanov, and all the officials ignore the key issues. And these issues are discussed very rarely, and then not in the federal mass media. A lot of time has passed since the formation of the Government, there are already many signs that the Government will continue its previous liberal course. This course will continue to erode the remnants of our economy".
Ivashov L. The fight against corruption should begin not in Dagestan, but in the Kremlin! Portal Publitsist.ru. 2018. February 9. Available at: https://publizist.ru/blogs/108984/23242/-	"If we look at our government and a number of arrested governors, let's face it: after all, they were given regions and the work of their inhabitants to supervise. And the radical measures that are being taken today in Dagestan, the arrests of high officials – this is most likely not a systemic fight against corruption. Because corruption starts, alas, not in Dagestan, not in Kamchatka, not in Khanty-Mansi Autonomous Okrug...When starting a fight against corruption, Putin must begin with the Kremlin, for all officials who have been arrested in Dagestan, have the protection in Moscow".
Prokhanov A. Defense consciousness. The enemy is at the gate. Gazeta "Zavtra", 2018, February 7. Available at: http://zavtra.ru/blogs/oboronnoe_soznanie_vrag_u_vorot	"Today the Russian state has no money... The funds are empty. The accumulations have been spent. Billionaires have money and keep them in offshore zones and U.S. securities. These untold riches are the result of shameless exploitation of the Russian people who have been put on the brink of poverty and extinction. Urgent tasks for the Kremlin and for Putin are to return all this money to Russia, to direct it to development, to provide a breakthrough with it".
Fursov A.I. The one who wins will live. Gazeta "Zavtra", 2018, January 22. Available at: http://zavtra.ru/blogs/elita_-_hhi	"The elite, which associates itself with "Barvikha Luxury Village" and which will certainly hand over everything for this "Barvikha Luxury Village" and will lose...therefore the most important, necessary condition of a victory consists in the fact that the elite has to associate itself with society of which it is part".
Korotaev S.A., Shkaratan O.I. Post-soviet statehood and society: the evolution of social contract and legitimizing of authority. Part 3. The strengthening of statehood and social contract between society and authorities. Social Sciences and Contemporary World, 2018, no. 1, p. 70.	"The Russian elite is not characterized by citizenship and state thinking. Its lack of interest in resolving the situation concerning the poverty of the majority of citizens and its indifference toward the future of domestic science and innovative economy are explained by the syndrome of rapidly enriched people who care only about themselves and their environment. This "set" of values largely determines not only the essence, but also the form and methods of public administration".

Continuation of Insert 3

Gorshkov M.K. Television program "An evening with Vladimir Solovyov", aired June 15, 2017.	"In order to assess the efficiency of officials, it is necessary to add subjective indicators to the dry figures of objective indicators of economic development. How high is the satisfaction of people with different aspects of life: are you satisfied with the standard of living? With your salary? With the quality of healthcare? With the education your children obtain? With the quality of your leisure?.. We have 15 points of such indicators. Does anyone take them into account? Is anyone interested in them? If these figures were included in the total volume of state statistics, I am afraid that half of the officials would be fired".
Starikov N.V. It's time to adopt a law on the convening of the Constitutional Assembly. Official blog of N. Starikov. March 6, 2017. Available at: https://nstarikov.ru/blog/76003	"We are concerned with the following question: why for 23 (!) years since the adoption of the Constitution, a working version of the most important federal constitutional law has not yet been developed and adopted? The text of the Constitution itself was drafted and adopted in a matter of months. The law on the Constitutional Assembly has not been adopted so far. Have we suddenly run out of competent lawyers and constitutional law specialists? Or is it a question of political will? Most likely – the latter...".
The implementation of "Growth Strategy" will allow Russia to double the GDP by 2035: an interview with B.Yu. Titov (February 20, 2017) / Website of the Stolypin Club. Available at: http://stolypinsky.club/2017/02/20/boris-titov-realizatsiya-strategii-rosta-pozvolit-rossii-k-2035-godu-udvoit-obem-vvp/	"Now the World Bank estimates the possibility of growth of the Russian economy by 1.2% until 2025. The same assessments are given by our Government. We believe that the Russian economy cannot develop at the rate of 1% of GDP per year if the average rate of the world economy is 3%. If we do not have a 4%–6% growth, it will lead to further stagnation and Russia will move to the second and then to the third tier of countries by economic indicators...The growth rate of less than 2–3% means that Russia may lag behind the leading countries of the world forever...".
Spitsyn E.Yu. A lecture in the "Polytkafe" (Moscow, December 27, 2016). Official blog of N.Starikov. available at: https://nstarikov.ru/blog/73788	"Our problems in all spheres of life – in the economy, in education, in health care and in foreign policy – are largely due to the fact that our political leadership (top and middle), officials of different levels, profess doublethink and sit on two chairs. It is impossible to carry out any political course while sitting on two chairs. Sooner or later, these chairs will be drawn apart and you will fall and hurt yourself really badly. And we won't get any further while on the one hand we have a kind of patriotic rhetoric and on the other hand – a completely blatant anti-patriotic course. Therefore, sooner or later such things will put the following dilemma before our leadership: to make this choice (maybe a metaphysical one) – what way should today's country move along?»
Boldyrev Yu.Yu. How the liberals were selling Russia: "A rat will eat three corns, and spoil a million more". Moskovskiy komsomolets, 2016, December 8.	"Ignoring the norms of the Constitution is an issue that concerns exclusively the representatives of the comprador elite, who consciously give priority to their private interests to the detriment of the interests of Russian society. And it also concerns "the central government – the President and Parliament, who have all the powers".
Delyagin M.G. The liberals treat Russia like a cutlet – an object of consumption. Online newspaper "Biznes-online", 2016, November 9. Available at: https://www.business-gazeta.ru/article/327971	"The President should deal with the strategy, the Government should deal with the economy, and the Bank of Russia – with the financial system. But the fact that the President, having delegated the duties, does not control their execution properly and even puts up with the chronic sabotage of his own "May decrees" is not so much a manifestation of humanity as a deep vice of our entire system of governance. This is where the threat to our entire future comes from. The problem of the economy lies not in cheap oil or sanctions, but in that all the activities of the liberals holding key positions in the Medvedev's Government and Nabiullina's Bank of Russia, as far as can be judged by their actions, are subordinated to the task of hampering the development of our country. And in general, because we tolerate them, they succeed in it...".
Gaganov A.A. Does Russia have strategic planning? Sulakshin's Center (Center for Scientific and Political Thought and Ideology). 2016. January 28. Available at: http://rusrand.ru/analytics/est-li-v-rossii-strategicheskoe-planirovanie	"We have a law on strategic planning, but so far it is useless. The executive authorities are mainly engaged in finding tactical solutions to acute issues. The function of strategic planning is implemented haphazardly, in the medium and short term, which does not the existing acts to be turned into real strategic management tools. The lack of long-term planning has led to the fact that the vast majority of issues in all areas of the country's life remained unresolved over the past decade. There are no political mechanisms and institutions to ensure the responsibility of the executive authorities for the results of their activities. They can affect any area of public administration; in particular, it impedes the development of strategic planning".

End of Insert 3

Sulakshin S.S., Bagdasaryan V.G. et al. Is Russia Waiting for a Revolution? Issues of Transition to the Post-Liberal Model of Russia (Algorithm and Scenarios). Moscow: Nauka i politika, 2016. P. 669–670.	"There have been no significant changes in the liberal model of the country for many years, and even in the crisis years of 2014–2015. The commitment to the liberal model is only confirmed. Accordingly, the degradation processes turning into crisis ones also become sustainable. Personnel policy is extremely conservative. The system of reflection in the management is almost suppressed, the control center is in its own trap of false information. The system of initial values and goals seems to have finally squeezed out of its lists the interests of the country as a whole, the interests of the majority of the population, sustainable development, positioning of the country in the world, and success in the classical set of development goals of the country…Thus, the recent historical process in which Russia is immersed has become more certain. Proceeding from its qualitative vision, the most likely conservative options, according to the study, are not surprising. This is a scenario of prolongation of the liberal model, a scenario of balancing on the threshold of sustainable development".
Polterovich V.M. Reformers of science lack the necessary qualifications to cope with the task. Ekonomicheskie i sotsial'nye peremeny: fakty, tendentsii, prognoz, 2015, no. 3, pp. 28-31.	"Our officials do not know the basic technique for carrying out institutional reforms. And one of the main mistakes they make and repeat from reform to reform is the use of the so-called method of shock therapy. For instance, the draft law of June 28, 2013 (on the reform of state academies) is a typical example of shock therapy. The goals of this law had nothing to do with the goals of raising the level of science in Russia. Everyone knows what we have got. The compromise we now have is achieved in a desperate struggle rather than in the design process. This leads to enormous costs".
Dobren'kov V.I., Ispravnikova N.R. The Russian version of the "capitalism for the few": is there a way out of the impasse? Vestnik Moskovskogo universiteta. Seriya 18: Sotsiologiya i politologiya, 2013, no. 3, p. 26–55.	"Taking into account the economic inefficiency and social illegitimacy of the structure of property rights established at the beginning of the 2000s, there arises the question of a possible revision of the results of privatization of the early 1990s and their adjustment. At the same time, it is obvious that attempts to revise the results of privatization will encounter many restrictions related to the dominant role of "capitalism for the few" in the Russian economy. The institution of illegitimate property in such conditions ensures the reproduction of corrupt power relations of a limited group of persons rather than sustainable long-term socio-economic development, economic growth and modernization of the economy. In the most general form, the opinion of specialists, experts and the opposition boils down to the fact that a comprehensive program is needed to overcome the merging of oligarchic structures and the ruling elite of the Russian economy... "Capitalism for the few" in modern Russia has developed a certain system of basic values. This system with a certain degree of accuracy can be called anti-national. It should be noted that as a subject of the Russian economy, the business elite of the new formation acts mainly as foreign investors. Illegitimate property on the territory of Russia belongs to foreign legal entities, mostly offshore companies. We can say that the key actors of the ruling layer consciously appeal to the resources of other states as guarantors of their interests in the political and economic space of Russia... Following the course of "capitalism for the few" leads the country to a dead end: deprives it of prospects for state-political and socio-economic development, leads it to backwardness, socio-political degradation and state disintegration. The national task is to deprive the key actors of the ruling stratum – modern oligarchs and the ruling elite – of unjustified influence on the development of the country, the corrupt receipt of super-profits, the possibility of shadow influence on public authorities and management at all levels, as well as political parties, the intellectual environment, the expert community. Solving the problem of changing the nature of the country's development requires a radical strengthening of the Russian state, which meets the interests of its fair, dynamic and effective development".
Vladimir Putin's Big Government and the "Politburo 2.0": a report by Minchenko Consulting Communication Group. 2012. P. 2.	"The ruling elite of Russia can be described in the model of the Soviet collective authority – the Politburo of the Central Committee of the Communist Party of the Soviet Union. The process of ruling is aimed primarily at maintaining the existing inter-clan balance... The Russian government is a conglomerate of clans and groups that compete with each other for resources. And the role of Vladimir Putin in this system remains unchanged – it is the role of referee and moderator".
Abalkin L.I. The way toward success lies through consistency and cooperation. National Projects, 2007, no. 8 (15), pp. 12–13.	"The current governmental policy in the field of economy and management is internally contradictory and not effective enough. There are many examples. The Pension Fund, conceived as a source of "long" money, is subsidized by the budget. "Monetized" benefits require more funds for their implementation than before. Huge foreign exchange earnings are not used to stimulate domestic production. With the reduction of employment in the country, the number of administration employees has doubled. Officials have usurped state power and made it a source of illegal funds... We need a strategic worldview, a distinctive feature of which is the priority of system over an uncoordinated series of individual measures".

Experts pay attention to the facts of tampering with statistics and to the revisions of the target indicators; this leads to the failure of the Government to fulfill the orders and the "May decrees" of the Presiden[50]. They prove that there was no need to carry out the 2018 pension reform, that it was implemented incorrectly and, most importantly, that it will not bring the desired effect of raising the standard of living of pensioners[51]. They point to the non-working law on strategic planning[52] and to the transformation of the once second world economy into a "service economy" that is fully focused on the interests of "leading companies of global markets rather than on the training of personnel for industry, science and education in Russia"[53]. Experts also speak about the inadmissibility of subordination of Rosstat to the Ministry of Economic Development[54] and about the activities of the Central Bank of the Russian Federation that contradict Russia's national interests[55]; experts also consider social inequality, which significantly exceeds the critical level in Russia, such a situation carries "risks to the functioning of social relations", "threat of transition to a state of increased instability"[56], and the protest potential, which has for many years stably located at a dangerously high level of 20%[57].

However, the most important thing is that, analyzing the entire post-Soviet period, and often comparing its results with the achievements of the Soviet Union, different experts come to the same conclusion: the "long state" created by V. Putin has an inefficient system of public administration, since the elites that rule it have a comprador essence[58], and they have not gone far from the "phantom" essence of the elite of the 1990s[59]. These elites are characterized by imitation of activity as "a process that reflects the substitution of activity in all its manifestations; deliberate forgery and plausibility in order to mislead or hide true intentions of the initiators of pseudo-activity"[60]. They are absorbed by the construction of the "capitalism for the few"[61] instead of bringing the situation in the country in accordance with Article 7 of the Constitution, in which it is said that Russia is a social state[62], the fact that experts also pay attention to[63].

Since the Government (according to Article 114 of the Constitution of the Russian Federation) participates in the development and execution of the federal budget and ensures a "unified state policy in the field of culture, science, education,

[50] A report of A. Zhulin, vice rector of the HSE, at the plenary session of the seventeenth April international conference. *NRU HSE news,* 2016, April 22. Available at: https://www.hse.ru/news/science/181135658.html

[51] Shirov A.A., Potapenko V.V. About a fair pension system. *Ekspert,* 2018, no. 24, June 11-17.

[52] Gaganov A.A. *Does Russia have strategic planning?* Sulakshin's Center (Center for Scientific and Political Thought and Ideology). Available at: http://rusrand.ru/analytics/est-li-v-rossii-strategicheskoe-planirovanie

[53] Betelin V.V. Russia needs to abandon the "economy of services" and shift to the economy of industrial production. *Ekonomist,* 2019, no. 2, pp. 3-12.

[54] Hansa V.A. Rosstat should be independent of the executive power (January 14, 2019). Available at: https://kprf.ru/dep/gosduma/activities/181747.html

[55] Glazyev S.Yu. Central Bank Policy is more harmful than the sanctions. *S.Yu. Glazyev's website.* April 6, 2019. Available at: https://glazev.ru/articles/165-interv-ju/66501-politika-tsentrobanka-vrednee-sanktsiy

[56] Glazyev S.Yu., Lokosov V.V. Assessment of critical threshold values of indicators of the state of Russian society and their use in the management of socio-economic development. *Vestnik RAN,* 2012, vol. 82, no. 7, pp. 587-614; Lokosov V.V. The method of critical threshold indicators and the evaluation of human potential. *Ekonomika. Nalogi. Pravo,* 2012, no. 5, pp. 71-75.

[57] Sheinis V.L. Historical transit: Russian drama. *Nezavisimaya gazeta,* 2017 January 27. Available at: http://www.ng.ru/ideas/2017-01-27/5_6914_drama.html

[58] See, for example: Gubanov S.S. Pension aggravation: what it means and what it will lead to. *Ekonomist,* 2018, no. 9, pp. 10-24.

[59] Toshchenko Zh.T. *Phantoms of Russian Society.* Moscow: Tsentr sotsial'nogo prognozirovaniya i marketinga, 2015. Part 1.

[60] Toshchenko Zh.T. New faces of activity: imitation. *Sotsis,* 2012, no. 12, p. 24.

[61] Dobren'kov V.I., Ispravnikova N.R. The Russian version of the "capitalism for the few": is there a way out of the impasse? *Vestnik Moskovskogo universiteta. Seriya 18: Sotsiologiya i politologiya*, 2013, no. 3, p. 30.

[62] The Constitution of the Russian Federation. Article 7. *Consultant Plus database.* Available at: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=2875&fld=134&dst=100040,0&rnd=0.2480454526720497#08426057577392236

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

health, social security, environment"[64], it cannot be considered as a mild irritant, which uses its solutions that are incomprehensible to the people to provide a sacred connection and mutual understanding between society and the President. **Almost all the points of the May Decree and national projects, according to which Russia must make a decisive breakthrough and catch up with the leading countries of the world until 2024, are the field of activity and responsibility not only of the President, but also of the executive power, so the focus of the elites on national interests is a fundamental condition, without which the "long state" cannot exist.**

And an equally important condition when governing the country consists in the necessity to hear and largely focus on the opinion of competent people, which is based on historical facts, statistical information and mathematical calculations.

If the assessments of experts from the scientific community are the first element of the foundation capable of ensuring the existence of the "long state", then ***the second element consists in the fact that Russia has accumulated considerable practical experience in effective public administration***, which must be extrapolated to the key areas that ensure the dynamic development of the standard of living and quality of life and to those areas where Russia's lagging behind poses a direct threat to national security.

This example is set by the same person on whom, in fact, the "long state" rests upon – the President of the Russian Federation, who manages foreign policy (according to Article 86 of the Constitution of the Russian Federation) and is the Supreme Commander-in-Chief of the Russian Armed Forces (according to Article 87).

A retrospective look at V. Putin's political career clearly shows that the President's personal intervention in solving any problem almost always ends successfully and almost always takes place in the interests of the general public, in the national interests. This can be equally attributed to the accession of Crimea to Russia, and to the ban on the abolition of suburban electric trains.

As leader of the "power bloc", V. Putin successfully dealt with the "Chechen crisis" before assuming office as President; later the oligarchs who were unruly in the 1990s were "brought to heel"; the geopolitical status of Russia as one of the main centers of the multipolar world was restored; an active and long-term fight against corruption was initiated, and it did not spare the officials of the highest level; the Russian army was completely redesigned externally and internally and, most importantly, at the present historical moment, the security of Russia's external borders for the near future has been ensured, that is, everything has been done to solve the urgent problems "inside the country, in our own home"[65].

Many of those who criticize the independent course of foreign policy implemented by V. Putin look at the situation quite differently, making him responsible for the growth of anti-Russian sentiments, economic sanctions and many other symptoms, clearly indicating that the Western world (the U.S. and Europe) do not like a strong neighbor, especially a neighbor such as Russia. Much criticism concerns the fact that the expenditures on defense (especially when Russia enters into military conflicts outside its territory) could be directed to addressing social needs, and then we would have long been leaders in healthcare, education, science...

However, if we take into consideration the historical relationship between Russia and the United States, as well as the "instinct of state power"[66] that both countries have, we should note that Russia's geopolitical vulnerability in the 1990s (both in terms of foreign policy and in terms of the outdated military-industrial complex)

[64] The Constitution of the Russian Federation. Article 114. *Consultant Plus database*. Available at: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=2875&fld=134&dst=100040,0&rnd=0.2480454526720497#08426057577392236

[65] Transcript of the direct live TV phone-in with Vladimir Putin, April 16, 2015. *Official website of the RF President*. Availablwe at: http://www.kremlin.ru/events/president/news/49261

[66] Berdyaev N.A. *The Origin of Russian Communism*. Paris, 1955. P.15.

Insert 4

Dynamics of crime statistics in Russia

Indicators	*For reference: 1990*	2000	2005	2010	2015	2016	2017	Dynamics, in %		
								2000 to 1990	2017 to 1990	2017 to 2000
Number of offenders identified, thousand people	*897.3*	1741.4	1297.1	1111.1	1075.3	1015.9	967.1	**194.1**	**107.8**	**55.5**
Total number of registered crimes, thousand cases:	*1839.5*	2952.4	3554.7	2628.8	2388.5	2160.1	2058.5	**160.5**	**111.9**	**69.7**
Murder and attempted murder	*15.6*	31.8	30.8	15.6	11.5	10.4	9.7	**203.8**	**62.2**	**30.5**
Intentional infliction of grievous bodily harm	*41*	49.8	57.9	39.7	30.2	27.4	24.6	**121.5**	**60.0**	**49.4**
Rape and attempted rape	*15*	7.9	9.2	4.9	3.9	3.9	3.5	**52.7**	**23.3**	**44.3**
Robbery	*83.3*	132.4	344.4	164.5	72.7	61.5	56.9	**158.9**	**68.3**	**43.0**
Robbery with violence	*16.5*	39.4	63.7	24.5	13.6	11.4	9.1	**238.8**	**55.2**	**23.1**
Theft	*913.1*	1310.1	1573	1108.4	1018.5	871.1	788.5	**143.5**	**86.4**	**60.2**
Terrorist act, cases	*No data*	135	203	31	8	25	37	**No data**	**No data**	**27.4**
Crimes related to drug trafficking, thousand cases	*16.3*	243.6	175.2	222.6	236.9	201.2	208.7	**1494.5**	**1280.4**	**85.7**
Traffic accidents, thousand cases	*96.2*	52.7	26.6	26.3	26.7	22	21	**54.8**	**21.8**	**39.8**
among them the number of those that entailed death through negligence	*15.9*	15.4	15.7	10.3	9.5	7.9	7.5	**96.9**	**47.2**	**48.7**
Bribery, thousand cases	*2.7*	7	9.8	12	13.3	10	6.3	**259.3**	**233.3**	**90.0**
Economic crimes, cases	*No data*	80931*	276435	202454	108754	105087	109463	**No data**	**No data**	**39.6****
Number of persons who committed economic crimes, people	*No data*	47247*	101728	64593	46952	47328	47134	**No data**	**No data**	**46.3****
Number of victims, people	*No data*	2095500	2809200	1785200	1699000	1544200	1417400	**No data**	**No data**	**67.6**
Number of persons held in detention facilities, thousand people	*No data*	925.1	823.4	819.3	639.9	630.1	602.2	**No data**	**No data**	**65.1**
Number of crimes committed by minors or with their complicity, thousand people	162.7	195.4	154.7	78.5	61.8	53.7	45.3	**120.1**	**27.8**	**23.2**
Number of minors who have committed crimes, thousand people	153.2	177.9	150.0	72.7	56.0	48.6	42.5	**116.1**	**27.7**	**23.9**
Number of crimes committed by persons who have previously committed crimes, thousand people	257.9	651.5	517.4	530.7	688.8	674.9	650.6	**252.6**	**252.3**	**99.9**

* Before 2005 – number of economic crimes/persons who committed economic crimes.
** Dynamics by 2005
Source: Federal State Statistics Service. Available at: www.gks.ru.

Insert 5

Dynamics of people's subjective assessments of the level of security and the work of the police (data on the Vologda Oblast, % of respondents)

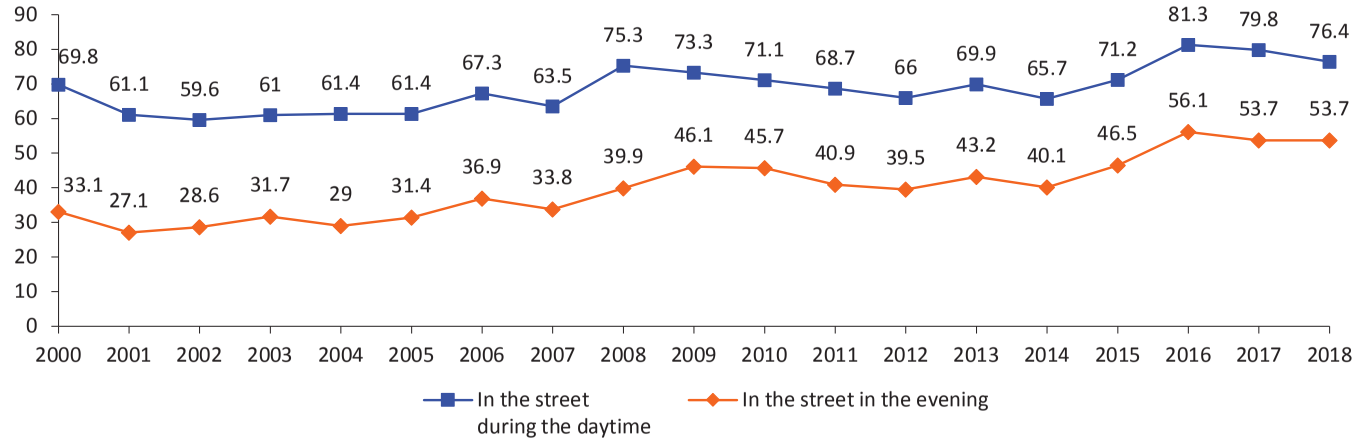


Figure1. **Do you feel secure at present?** (answer option "yes and sooner yes than no"), % of respondents

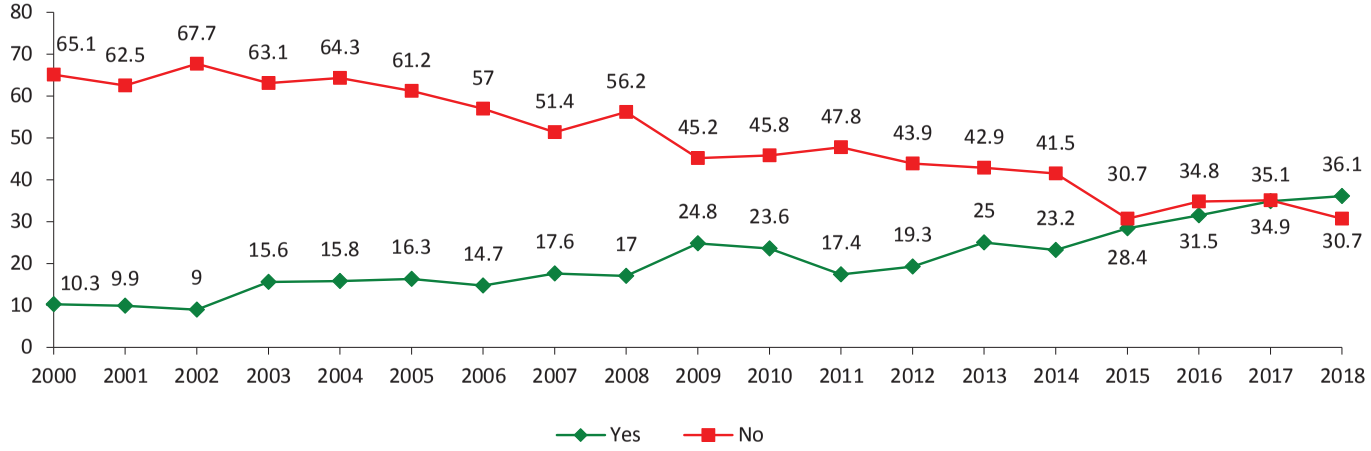


Figure 2. **Do you think that at present the police can cope with crime?** (% of respondents)

made absolutely any scenario of its future possible, including the most catastrophic one.

It is difficult to question the outstanding achievements and breakthrough efforts with which the Russian army was actually redesigned "from scratch", including not only advanced weapons, but also, above all, the morale and prestige of military service. This is fully proved by Russia's effective participation in military campaigns outside the country and by specific episodes of heroic deeds of ordinary people, which, of course, would not have been possible without sincere and high feelings towards their Motherland.

However, an equally impressive effect of the transformation of the power bloc can be seen in civilian life. Throughout the period from 2000 to 2017, there was a continuing decrease in the crime rate in Russia, including various types of serious offences (murder, robbery, etc.) and economic crimes *(Insert 4)*.

People's subjective assessments are revealing as well; for instance, in the period from 2000 to 2018, people began to feel safer on the street more often. In particular, it is due to the significant increase (from 10 to 36%) in the confidence that the police are able to cope with crime *(Insert 5)*.

In the structure of the most pressing issues that people are concerned about, the issues such as "high crime rate, vulnerability to crime, hooliganism" moved from the third to the tenth place (37% of the inhabitants of the region in 2000 and 19% – in 2018 were concern about these problems; Tab. 1).

Thus, Russia has accumulated considerable experience of what could serve as the foundation for the future of the "long state". The problem is that this experience does not extend beyond itself; this extension is hindered by the comprador interests of the ruling elites, and their actual influence on the present and future of Russia is manifested in this very fact (rather than in "some events" with the "detached" participation of the "deep" people[67]).

Formally, there is nothing that can prevent the President from eliminating the "intellectual feebleness"[68] of the ruling elite. Article 83 of the Constitution of the Russian Federation gives him the right to appoint the Prime Minister, nominate a candidate for the post of Chairman of the Central Bank, make decisions on the resignation of ministers, etc. However, to do this it is necessary to show political will: "turn the page"[69] and "make long overdue, difficult, but extremely necessary decisions"[70].

IV. Prospects for the future of the "long state".

We can either agree or argue with the conceptual propositions put forward by V. Surkov in his article entitiled *Vladimir Putin's Long State*. In the same way it is possible to discuss the motives which have urged him to publish an article that is so resonant in its content.

In our opinion, it is important to emphasize something else: Surkov's article revealed two extremely acute issues that, by and large, were relevant throughout the post-Soviet period, but today their severity has increased so much that they can no longer be ignored, and, apparently, the Kremlin is also aware of this.

The first question is related to the need for deep reflection and understanding of the cultural and historical movement of Russia: where does the "long state" of V. Putin come from? Where is it going? And to what it must go? These issues are closely related to the development of the concept of state ideology, which Russia cannot have, because Article 13 of the Constitution of the Russian Federation states that "no ideology may be established as state or obligatory one"[71]. The need to address these issues

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

[68] Noskovich O.I. How to build a long state? *Nezavisimaya gazeta,* 2019, March 18. Available at: http://www.ng.ru/ideas/2019-03-18/7_7533_ideas1.html

[69] Vladimir Putin's speech at the congress of the Russian Union of Industrialists and Entrepreneurs on February 9, 2012.

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

[71] The Constitution of the Russian Federation, Article 13, Paragraph 2. Available at: http://www.constitution.ru/10003000/10003000-3.htm

that are critical to the existence and development of the state and society has long been expressed by experts[72]; however, if earlier it was only their warnings, **today the objective conditions have changed radically – the needs of society, its demands, values, and requirements to the Government.** This forces the state to respond to this problem in one way or another, including through the article by V. Surkov.

The second issue is even more specific and acute. Due to the fact that the system of the "long state" built in the post-Soviet period depends entirely on a specific person – the President of the Russian Federation, the question arises what will happen after V. Putin. The need to find an answer to it is outlined by a specific and extremely short-term time frame – the year 2024 (and according to some estimates, 2021 – the year of the parliamentary election[73]).

Putin's truth lies in the fact that his control does not extend to the future. He has not established the natinal idea, he has not institutionalized his political course; he has not established a new state elite; he has not formulated a strategic path for Russia. He said and did different things, some were successful and spectacularly positive and life-saving, others – completely disastrous and profoundly wrong. The balance of these pros and cons can be considered differently. In my opinion, in general there are more positive elements than negative ones. Putin saved Russia that had been hovering over the abyss, and returned it to its track. And it is excellent that he did this. But **none of his successes have reached the point of no return.** All of them will be questioned after his end[74].

According to some experts, "Putin owns the political present of Russia, but he won't have any influence on the future that will come immediately after him"[75].

Thus, the real test of V. Putin's "long state" consists not so much in the current "stress tests" (which are successfully handled by he President himself rather than by the system of public administration), as in how this "long state" can do without him.

The chronic incapacity of the post-Soviet state leadership in the field of national economy is fully manifested in the systemic crisis, deindustrialization and scientific and technological backwardness; this incapacity did not arise out of nowhere, but was generated by the comprador economic system, and its profoundly negative influence on Russia has long been clear and does not require evidence.

The pumping out and offshoring of comprador rents, the transformation of Russian property into non-Russian, the transformation of national wealth into transnational – all this is incompatible with the rise of the productive forces of our country and the quality of life of the working majority[76].

V. Surkov's article provides an answer to this question, but it does not look convincing. The author basically describes the present and explains why the Russian people are so patient. However, in the context of internal and external challenges that V. Putin's "long state" is currently facing, this explanation is clearly not enough.

The steady increase in the proportion of Russians who demand changes suggests that the "deep people" expect the head of state to take decisive action to fulfill his election promises, which will be manifested in actual changes in the standard of living and quality of life. The extent to which the general public feels these changes will determine the main thing upon which V. Putin's "long state" rests – this main thing is the quality of the sacred relationship between the

[72] See, for example: Sulakshin S.S. The quality and success of public policies and management. In: *Series "Political Axiology"*. Moscow: Nauchnyi ekspert, 2012. Pp. 6, 12; We have to change the Constitution!: an interview with N. Starikov, July 20, 2014. available at: https://www.youtube.com/watch?v=ZSe6kFB-OQ8

[73] Gurova T., Skorobogatyi P. People are too independent to be bought for a grant (interview with V.V. Fadeev, Chairman of the Public Chamber of the Russian Federation). *Ekspert,* 2019, no. 1-3, p. 59.

[74] Dugin A. Putin or Super-Putin. *Official website of the Izborsk Club*. 2019. February 12. Available at: https://izborsk-club.ru/16492

[75] Dugin A. Putin or Super-Putin. *Official website of the Izborsk Club*. 2019. February 12. Available at: https://izborsk-club.ru/16492

[76] Gubanov S.S. Pension aggravation: what it means and what it will lead to. *Ekonomist*, 2018, no. 9, p. 19.

people and the President: his successful actions will strengthen this relationship and his unsuccessful actions (as shown by sociological surveys in recent months) can lead to the fact that people can lose their trust in the President and place him among those who show not only the feebleness of intellect but also the feebleness of will.

Since the draft law on the pension reform was submitted to the State Duma, the level of approval of the President's work has decreased in the Vologda Oblast (according to the data of VolRC RAS) by 14 p.p. (from 70% in June 2018 to 56% in April 2019), in Russia as a whole (according to VTsIOM) – by 8 p.p. (from 73 to 65%)[77].

In addition, the numerous consequences of "oligarchic capitalism" and "intellectual feebleness" of the ruling elites (in the economy, politics, social sphere, etc.) are objective, which does not allow them to be ignored, because they are the cause of "our main enemy – backwardness" and, if ignored further, this lag will only increase, becoming a more tangible threat to national security.

The "long state" created by V. Putin, is as durable as it is fragile, because it is not ready for significant transformations of the system of public administration, and without these transformations it is impossible to implement such ambitious plans that were announced by the President in 2018. Recent historical experience shows that even a "political machine" such as the Soviet Union literally collapses if it is unable to adapt to rapid changes in objective conditions and social needs. Today, V.Putin's "long state" is at risk of "walking into the same wall" if it continues to depend solely on his personal qualities and the infinite patience of the "deep people".

"The pace of technological change is increasing rapidly" and "the changes taking place in the world are of a civilizational nature"[78]. **This process is going too fast to keep up with it if only "cosmetic changes" are implemented within the framework of the ossified system, which is actually a quarter of a century old.**

Who are we? Where did we come from? Where are we going? These questions have never left the thinking part of our society alone. After all, we are the main country of the transit of mineral resources, goods, but more importantly, people and, still more importantly, ideas. In order to provide for the further transit of our national idea, the government should treat the main resources of our people – the mind and conscience – attentively and carefully. We all remember the slogan of the Soviet era: "the Party is the mind, honor and conscience of our era". The government should have the honor, so that the mind and conscience of the people could have a future[79].

Nevertheless, the presence of two resources, which are not mentioned in V. Surkov's article (accumulated scientific potential and positive experience of state management of the military-industrial complex), allows us to look into the future with restrained optimism: **with hope, because the potential of these factors is huge, and with anxiety, because to realize this potential requires not only a deep intellectual understanding of the necessary strategic decisions, but also specific political actions of the President of the Russian Federation V. Putin; it is a necessary condition for the creation of a really strong "long Russian state" that continues its thousand-year history.**

[77] For more information, see the section *Public Opinion Monitoring* in our journal (pp. 238-245).

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

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SOCIO-ECONOMIC DEVELOPMENT STRATEGY

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Technological Development: Investment Structure Impact*

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Abstract. The study is aimed at determining the impact of a technology investment structure on changes in technological effectiveness of the economy that should be taken into account in the medium and long term. The research methodology includes structural and empirical analysis of the distribution of investment between new and old technologies, econometric models of technological level and investment in new and old technologies that have undergone a reasonable selection procedure according to the principle of best reliability; involves formulation of general principles and substantiation of technological development goals for the medium and long term. The technology structure determines potential of technological development and its dynamics. It is based on realized medium- and long-term goals and search for responses to competitive challenges. The work results in confirmation of the investments structure influence on the overall level of technological effectiveness of the economy, different sensitivity of investment in new and old technologies to changes in risk and interest rates. For Russian economy the analysis of two sectors, particularly manufacturing and transactional raw materials ones, shows that with interest rates gone up, we observe faster decrease in investment in new technologies than those in old technologies, the level of manufacturability goes down as well. Therefore, the task of Russian economy technological renewal can be solved with regard to risk reduction measures in the manufacturing sector and application of differentiated interest rates in a sectoral perspective, ensuring its overall reduction. Using the taxonomic analysis method, the author identifies key models of technological development (at a theoretical level) according to characteristics of the structure of investment in new and old technologies. This helps specify

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economic policy measures in terms of the impact of investments distribution on the technological level, as well as their dynamics, that is, evaluate contribution of investments in various types of technologies to the overall rate of economic growth.

Key words: technology, investment in new and old technologies, medium- and long-term goals of technological development, challenges and responses to the technology development, algorithm for elaborating development goals.

1. Introduction. Problem statement and research methodology

Technological development is characterized by considerable instability. Modern economic changes are associated with the deformation of previously adopted and established standards and rapid changes in institutions and technologies. Institutional instability increases sharply [1–10]. However, what are the reasons for such changes?

First, the expanding research and technological diversity, the rapid transfer of knowledge and experience over long distances with the training of a significant number of people, helps implement for a short period of time a particular solution, get ahead in the competitive race.

Second, knowledge and new technologies based on it, on the one hand, expand the opportunities; on the other hand, generate high uncertainty about the prospects of economic relations and development. This uncertainty increases business risks [11–15].

In the framework of the modern theory of economic growth and development, the aggregated models do not take into account the structural aspects of technology performance, especially the impact of macro-parameters of the economy on the change of the technological level [2–3, 8–10, 14–15]. Medium- and long-term technological development goals also require algorithms for harmonization within a single system of state planning; without such procedures it will be difficult to select priorities, especially if the state of the existing technological structure is not taken into account, measures to stimulate technological development may increase the imbalance in economic development.

In the medium term, safety and increase in efficient use of available technological reserve is important, while in the long term the purpose is to change the technological paradigm of life as a mode of reproduction based on a set of advanced technologies different from the previous class of technologies in higher efficiency.

The correlation between medium- and long-term technological development goals can be studied through analyzing the structure of "old-new" technologies[1] [2–3, 12–13], which can be achieved by solving the problem of investment distribution between these technologies, taking into account the impact of individual macro-parameters such as business risk[2] and interest rate. Next, we analyze the differences between the goals of technological development, with establishing possible algorithms for designing such goals in the framework of the general approach to planning, with further study of the impact of

[1] Investment in new technologies – the cost of technological innovation. Investment in old technologies – the difference fixed between capital investment and the cost of technological innovation. Source: calculated based on: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/science_and_innovations/ science/# and http://www.gks.ru /wps/wcm/connect/rosstat_main/ rosstat/ru/statistics/ enterprise/investment/nonfinancial /#.

[2] Risk is defined as standard deviation of profit based on: Rosstat collection *"Russia in Figures"* for 2006–2017, Section "Enterprise Financial Activity". The chosen research interval is 2005–2016, for which there is statistical information necessary for constructing models, for early periods there is no information.

investment in new and old technologies, as well as business risk in sectors and interest rate on the technological level. As applied research methods include comparative empirical analysis, econometric modeling (with selection of most significant statistical correlation of parameters)

2. Differences between goals of technological development over time

The overall purpose and meaning of technological development is to create a way to influence the resource, object, system, which would be more cost-effective than that which existed before. It is possible though either creating a method which until now was absent but necessary as it saves time and resources, or creating new types of goods, services, etc. [2–3, 14–17]. Thus, to create a new technology a method available at the moment is required – an old technology. Its capabilities, as well as the acquisition of new knowledge, create the potential for a new technology as a means of influence. This new technology can modernize the old technology, completely or partially replacing it (the process goes through the technological core [11, pp. 282–283]), or replace only the technological periphery, improving and updating the old technology. Therefore, the opportunities of technological development, the achievability of goals of this development strongly depend on the available technological framework, as well as the needs of production, the state of demand, the market structure, as well as the ability of science to create new knowledge, provide applied development results for their further introduction to forming the framework for improving applied technologies and creating new ones [3].

The long-term prospect for technological development is not easy to assess. For example, it is difficult to assess the seventh or eighth technological paradigms today because the forecast of the predominance of certain technologies in 50 or 100 years is within the scope of futurology. Economic science, despite the great importance of the neo-Schumpeterian school developing the idea of technological and economic paradigms and technological structures, is currently unable to state exactly what types of technologies will dominate after a specified time.

It is possible to imagine long-term goals in technology as goals of civilization preservation, extension of life on Earth. If plans can influence the development, provoking the performance of a particular trajectory, it is important not to develop on a chreod trajectory[3]. However, in the long term the most chreod trajectory is the civilization's loss of life force and/or its death due to war, or exhaustion of biodiversity, resources, climate disasters, etc. Technologically, economy should be organized in such a way that this aspect is prevented in the long run.

In order to achieve medium-term development goals it is necessary to analyze the current economic and technological state, determine priorities, ideally not normative, but based on the resource opportunities and objectives of economic development determined by the system of challenges and threats.

In this case, challenges are to be precisely identified, as well as threats to development, by providing methods of eliminating threats, reducing possible damage and preparing challenge responses. Challenge responses represent a system of measures that anticipates threats and damage because if the challenge is eliminated and the answer is received, the threat will not take place and damage will not be done. Here we face a "technological paradox" when the development of technologies requires a perfect technology of decision-making

[3] The term "chreod trajectory" in institutional economic theory means "inefficient development trajectory" which can be difficult to refuse.

and implementation of the state research, technological and educational policies that would contribute to technological development, and not act as a challenge to it, which requires a reasonable answer.

To sum up, the medium-term goals of technological development imply responses to current challenges in technology and state security, which requires setting priorities, order priority and volume of investment in areas of technological development (priorities), sectoral areas; and the formation of a plan for economic modernization. Usually, in a short and medium time interval, the technological map and areas of improvement in the near future are clear, only certain combinations, positions, priorities need to be clarified. Thus, the sixth technological paradigm includes nanotechnology, biotechnology, robotics, artificial intelligence, etc. However, it is important to understand what nanotechnology, robotics, artificial intelligence well be and what technologies are able to generate at the next stage of development. Only then can something be said about the opportunities of the seventh, eighth and further paradigms. For example, from the engineering point of view, these technological systems – robots, artificial intelligence, computer programs – are auxiliary technologies. The seventh or eighth paradigms will, for example, be characterized by eco-technologies, or technologies to save wildlife and forests, or the cultivation of new species of plants and the reproduction of human clones (genetic engineering). Many types of old technologies that make up the framework and standard of metal processing will remain. They can be repeatedly improved due to nanotechnology. In the author's opinion, it is technologies of energy generation and, what is important – distribution, and transportation that can and should change for human society to enter the era of a new technological revolution.

Thus, the long-term goals of technological development is the search for new technologies based on a radically different principle, affecting the basic processes of creating benefits and transforming resources, as well as managing the society. The long-term goals of technological development may include:

– environmental technology;
– technologies for conserving or restoring exhaustible resources or replacing them with inexhaustible resources;
– transgenic technologies;
– biocommunication;
– technology for preserving intelligent life on the planet.

Of course, these goals must be related to the technological problems of development of digital systems, electronics, nanotechnology, robotics, artificial intelligence, new machines, fully automated (autonomous) systems, genetics, etc.

Thus, there is an initial technological framework and promising areas of development based on the already established technological and research capacity.

Conditions for functioning of markets and countries in the world system determine the possibility of technological renewal. We select three elements that determine the strength of these conditions:

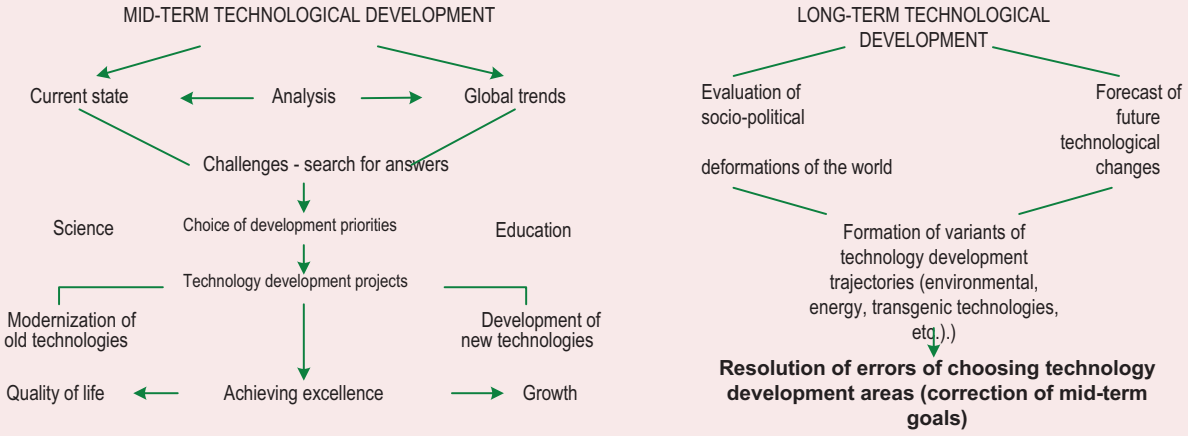
1) the socio-political structure of countries and world system, dictating the predominating economic model for the politics, which requires superiority in technology;

2) superiority is determined by: resources, level of research and technology (including social organization), historically established status and level of country's development;

3) economic development, determined by the standard of living and the quality of life, which must be related to the level of technological development.

The first element cannot be changed on the medium-term time interval. For this reason, the second and third elements are the focus of both

Figure 1. Approximate algorithm for determining medium- and long-term goals of technological development



Source: compiled by the author.

medium- and long-term technological development goals.

The difference in the approach to identifying medium- and long-term technological development goals is demonstrated in *Figure 1*. It demonstrates the different content of the process of formulating medium- and long-term goals of technological development, and both algorithms are naturally constituent elements of the system of state planning.

Medium-term goals require an in-depth analysis of the current state and development opportunities (potential), taking into account global trends and performance, methodological tools for choice managing and replacement of priorities in technology and other areas of economic development, coordinated projects or modernization of current ones or creating fundamentally new technologies. This will require addressing the structural challenge of allocating investment between support for old and new technologies. By solving it, it will be possible to ensure economic growth and improve the quality of life within the "superiority" paradigm. Long-term technological development requires a scenario forecast of what will happen to technology and the socio-political structure of the world and countries.

Next, several possible development trajectories are to be assessed, with indicating the dominant role of both certain types of technologies and the structure of technological paradigms. On a long-term time interval it is very important to take into account the errors when choosing options and the trajectory itself, providing methods for trajectory correction in technology development. This approach will help shift towards the algorithm of medium-term technological development and adjust the medium-term goals.

The pursuit of technological excellence is directly linked to the benefits that economy derives from it. In the medium term, challenges in specific areas provoke responses in the form of improvements in existing or new technologies. *Table 1* provides examples.

Table 1 demonstrates that some technological responses are new, some are modifications of the previously used technologies, but the search for an answer makes us develop and adapt to the changing conditions.

The superior response to the existing technological challenge refers to the development of technologies that would cover the advantages of the technological capacity available and used by the competing party

Table 1. Challenges and provoked responses in the form of development of new equipment and technologies

№	Challenge	Technical and technological development as a response
I) Military technology		
1.	Withdrawal from the Anti-Ballistic Missile (ABM) Treaty	Hypersonic air-launched ballistic missiles ("Kinzhal" (Dagger)), communication jamming, S-400 and S-500 S-400 missile systems, a new nuclear engine with unlimited missile range
2.	UAVs	Laser weapons
II) Food production technology		
3.	Prohibition on the supply of agricultural equipment, products (sanctions)	Development of breeding and seed production, GMO-free production
4.	Sanctions to supply of electronic components, dual-use technologies, and software.	Development of domestic technologies, import substitution, creation and development of electronic centers such as Zelenograd, etc. Development of own programs, work for domestic programmers
III) Financial technology		
5.	Blocking of Swift payment system, Visa and Mastercard cards, e-servers, bank accounts – dollar transactions.	Domestic payment system, Mir card, creating domestic financial platforms, transfer of payments to national currencies*.

* Some of these technologies are not new, it is a modification of the already used technologies, which is subject to a challenge response to preserve sustainable economic development and, most importantly, the country's economic and financial sovereignty.
Source: compiled by the author.

[18–22]. Based on the above, technologies, as well as responses to the challenges, can be "superior", "neutralizing" and "adaptive".

A) "Superior" technologies – leading advanced technologies, including impeding the efforts of a competitor (devaluing their efforts) to achieve excellence in this field. They tend to be less costly to implement, but ensure better results. Moreover, the competitor cannot find a superior solution on a fairly long time interval, that is, such technologies are long-acting, they block the competitor's prospects in this area. This type of technology embodies the highest novelty in technological development – advanced newly created, previously unused technologies.

B) "Neutralizing" technologies – technologies that nullify all competitors' measures at this stage of competition, but allow them to choose a different set of tools and methods on a different technological basis. Therefore, neutralizing technologies, which are cheaper than "superior", however, will not provide technological and other independence of development for a long time. However, it can be successfully applied as a quick response to buy time for strategic decision-making, especially if superior technology is not yet available. The costs of neutralization should not be large, then this option is acceptable and ready for use. Before the opposite side's introduction of technologies, the other side need to have a "neutralizing response" (technology). This type of technology symbolizes technological modernization.

C) "Adaptive" technologies – reduce the lag behind the leaders in technological development without creating development imbalances, and do not require high costs. Usually, they do not give complete neutralization and do not deprive the competitor of the opportunity to return the leading positions for some time. At the same time, the economy finds new opportunities to adapt to the dynamically changing technological landscape. These technologies and responses make it possible to agree on medium-term development goals and long-term targets. It is necessary to decide whether to respond to the challenges and in what way. The responses should lead to economic growth and improve the quality of life. [12, 18–20]

No matter which types of technologies and responses are considered, the problem of technological performance will be reduced to a technological structure where new and old technologies are present in economy and investment is distributed among these groups of technologies, setting the mode of their replacement and displacement [20, 22–24].

The assessment and implementation of the medium-term technology development goals involves:

– determining the actual state of economy, technological framework, global trends in technology and science development;

– analysis of military, political, financial, economic, social, demographic, environmental and other development challenges;

– analysis of the growth model and potential to improve the quality of life;

– the choice of development priorities be stage – period of stage realization;

– identifying necessary resources – investment to change the technological paradigm;

– analysis of the macroeconomic policy which either helps or does not implement development priorities; creating conditions for effective investment distribution between new and old technologies;

– implementation of medium-term planning of economic development projects and programs with a focus on technological renewal and creation of economic, institutional and social incentives for this;

– activation of the system of science and education – full focus on the development of new technologies and intellectual potential;

– modernization of existing technologies based on new principles – introduction of adaptive neutralizing technologies;

– solving the problem of advancing – creating new technologies based on fundamental research (scientific research), building schemes for their implementation in production.

In order to set and achieve long-term goals of technological development, a special type of forecast is required (the theory of technological paradigms is limited, as well as a technical and economic paradigm, since it is not clear what paradigm will prevail after a significant period of time). However, this inherent limitation should not discourage the researcher from making proposals for an indicative assessment of such goals, for example, based on short- and medium-term technological development goals.

The approximate algorithm for assessing the long-term goals of technological development, in the author's opinion, may imply:

– analysis of estimates and studies of futurologists and economists;

– analysis of trends in science development – fundamental disciplines – physics, chemistry, biology, electronics, etc.

– defining the possible "technological combinatorics" based on the properties of technological development for two medium-term prospects, as well as on what will be required to be solved by human society where restrictions are fatal (this will be the subject of search and creation of new technologies – according to the principle of threat overcoming, or refusal to use and reproduce other opportunities);

– assessment of imbalances created by new technologies in the medium term that will ensure future challenges and the technologies to address them.

This is not the whole possible list of long-term technological development goals. In this case, the combination effect in technology has a great potential even if the frequency of fundamental discoveries will decrease and there will be a period of stagnation of scientific discoveries. The combination effect helps solve many development problems, increase the

impact, create new activities for people, etc. In this regard, it is likely that new technological structures – the basis for economic development – will be formed according to the combination principle[4], the predominance of some types of technologies will not be a prerequisite and characteristic of technological performance [16–17].

However, such a possible outcome would still keep the competition between new and old technologies, with the growth based on old technologies being in some cases preferable to that based on new technologies, which is less stable. Therefore, the investment composition in old and new technologies determines modern technological development; it is determined by the amount of risk and return on old and new technologies, the state of sectors where different types of technologies are used. Let us consider this structure in relation to the Russian economy where the problem of technological renewal is acute. We use Rosstat data and econometric estimates, calculate the statistical significance of applied models, select the most appropriate models, study the sensitivity of investment in old and new technologies, as well as the level of technological effectiveness to risk and changes in interest rate in the manufacturing and transactional primary sectors[5].

[4] Combination principle – explains the combination of technologies with the emergence of new opportunities or technologies, or the improvement of old technologies; this process does not often require a lot of resources and investment.

[5] The manufacturing sector includes activities (under OKVED – Russian Standard Industrial Classification of Economic Activitiesc): section D – manufacturing; section F – construction. The transaction primary sector includes activities (under OKVED): section A – agriculture, hunting and forestry; section B – fishing, fish farming; section C – mining; section E – production and distribution of electricity, gas and water; section G – wholesale and retail trade; repair of motor vehicles, motorcycles, household goods and personal items; section H – hotels and restaurants; section I – transport and communications; section J – financial activity; section K – real estate, renting and business services; section L – public administration and military security; social security; section M – education; section N – healthcare and social services; section O – other community, social and personal services.

3. Changes in investment composition and technology: the impact of risk and interest rate

In economy, constant changes in both investment amount and investment composition in new and old technologies take place. There are different possible variants – the model of technological development depending on changes in investment and its compositionb (summarized in *Table 2*). It is important to assess the contribution that investment in new and old technologies makes to the product dynamics. On order to identify this contribution additional calculations are needed within the framework of the structural formula [18, pp. 23–26] for GDP growth rate:

$$g = g_c\, c + g_I\, n + g_G\, a + g_{NX}\, b,$$

where: $g = (1/Y)\, dY/dt$; $g_c = (1/C)\, dC/dt$; $g_I = (1/I)\, dI/dt$; $g_G = (1/G)\, dG/dt$; $g_{NX} = (1/NX)\, d\,NX/dt$, $c = C/Y$, $n = I/Y$, $a = G/Y$, $b = NX/Y$ – structural GDP parameters by expenditure $Y = C + I + G + NX$, C – gross consumption, I – gross investment, G – government expenditure, NX – net exports.

If we take into account the structure of "new-old" technology, the structural formula will be the following:

$$\frac{dI}{dt} = Is\frac{d\gamma}{dt} + \frac{dIs}{dt}(1+\gamma)$$

$$\gamma = \frac{In}{Is}$$

$$\frac{d\gamma}{dt} = \gamma(g_{In} - g_{Is})$$

$$d_{is} = \frac{Is}{I}$$

$$i_s = \frac{Is}{Y}$$

$$I = Is + In = (1+\gamma)Is$$

Hence:

$g = g_{In}(1+\gamma)\, \gamma\, i_s\, d_{is} + g_{Is}\,(1+\gamma)\, i_s\, d_{is} + g_c\, c + + g_G\, a + g_{NX}\, b.$

Table 2. Investment composition (In/Is) and models of technological development

Total investment - I	Composition of investment in "new–old" technologies	Technological development mode
I – increases (industrialization)	In –increases Is – increases	Innovation model. (technological industrialization). Development of high-tech industries (emergence of new) with the development of the initial technological basis, there are two modes in the ratio of growth rate of In and Is. dIn/dt> dIs/dt – innovative development driven by new technologies (stronger effect of displacement of old technologies by new ones) or dIn/dt<dIs/dt – innovative development with an emphasis on improving the existing technological framework (stronger effect of displacement of new technologies by old ones)
	In – increases Is – decreases	Model of technological breakthrough in which new technologies displace old ones (technological industrialization through technology substitution)
	In – decreases Is – increases	Model of strengthening the existing technological framework without new technologies (technological deindustrialization)
I – does not change (mixed models)	In – does not change Is – does not change	Preservation of technological development. Technological stagnation. Increased wear of the existing technological framework. (maintaining the industrial level)
	In – increases Is – decreases	The model of "creative destruction" in technology. For the given technological and industrial level there is resource distribution in favor of separate new technologies at the expense of old – the principle of "creative destruction"
	In – decreases Is – increases	Model of technological deindustrialization, with the growing influence of old technologies.
I – decreases (deindustrialization)	In – decreases Is – decreases	Model of absolute technological deindustrialization (technological degradation)
	In – increases Is – decreases	Model of "local innovation" amid general deindustrialization of a system
	In – decreases Is – increases	A model of conservation for technological backwardness
Source: compiled by the author.		

This type of structural formula indicates the contribution of new technologies to the overall growth rate of economy – by rate of growth investment; and old technologies – by investment rate in old technologies.

Based on Table 2, different models of technological development of economy are possible, depending on the emerging composition of investment in new and old technologies. Depending on the established model certain measures of economic policy that stimulate technological development and the transition from one model to another become natural. Such options are:

– increase in total investment if they are currently not increasing or decreasing; in the latter case it is required to have measures to counteract their reduction;

– increased investment in new technologies;

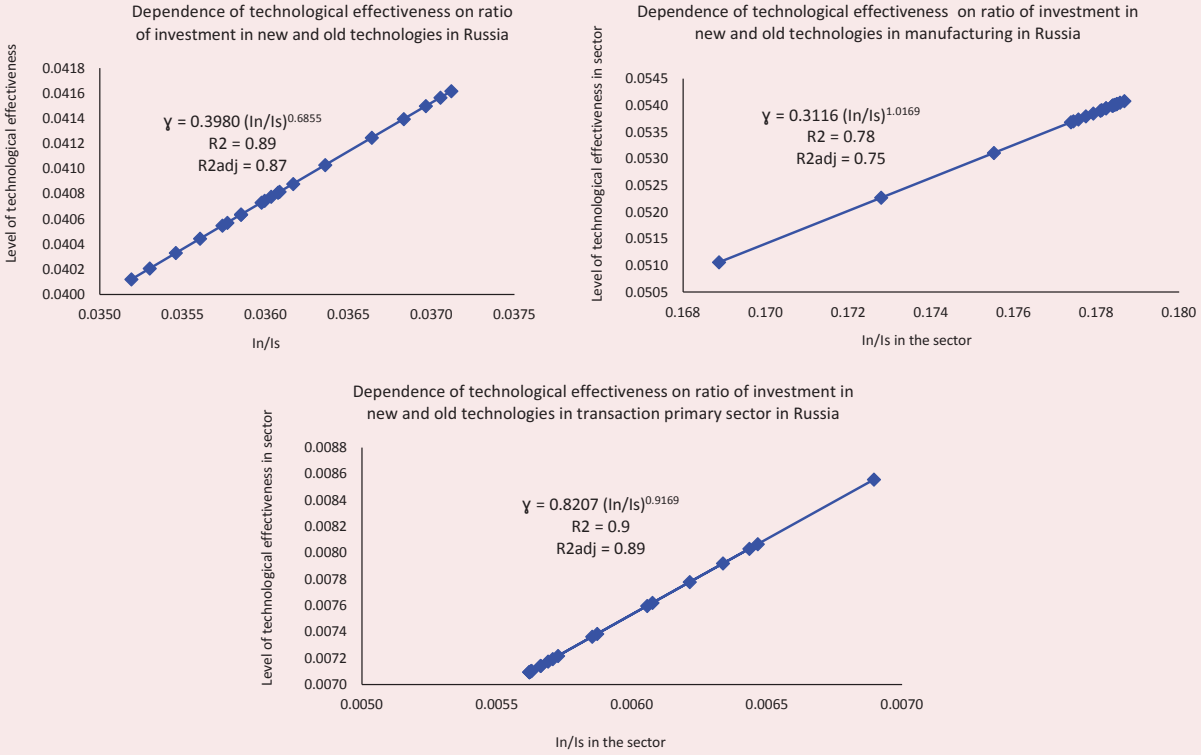
– increased investment to improve old technologies;

– change in rates ratio set in the general form of dIn/dt and dIs/dt with increased investment I and the growth of each component in investment composition in favor of investment in new technologies.

The selection of economic policy instruments taking into account industry specifics is a separate objective, but it will be associated with reducing business risks in economic sectors, since such an impact positively affects the amount of investment in old and new technologies.

It is natural to believe that a larger amount of investment corresponds to greater risks. The same dependence is typical for the Russian economy, including by sector – manufacturing and transaction primary sector. The level of technological effectiveness defined by

Figure 2. Level of technological effectiveness of the Russian economy*, manufacturing** and primary sector*** based on investment in new and old technologies (left to right)



* Statistics: F-criterion = 80.9; D-W criterion = 1.62 ∈ [1.33; 2.67]; White test: $\chi 2$ calculation. (0.08) < $\chi 2$ critical (3.8).
** Statistics: F-criterion = 36.9; D-W criterion = 1.63 ∈ [1.33; 2.67]; White test: $\chi 2$ calculation (0.13) < $\chi 2$ critical (3.8).
*** Statistics: F-criterion = 90.7; D-W criterion = 1,37 ∈ [1.33; 2.67]; White test: $\chi 2$ calculation (3.2) < $\chi 2$ critical (3.8).

Source: calculated based on: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/science_and_innovations/science/#; http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/enterprise/industrial/# and http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/enterprise/investment/ nonfinancial/#.

production ratio based on new technologies to production based on old technologies[6] depends on the ratio of investment in new and old technologies, respectively. With the growing profitability of sectors, the risks also grow. Increased costs of old technologies reduce the overall technological level; costs of new technologies increase the technological level in the Russian economy.

The level of technological effectiveness according to the above dependence parameters is demonstrated in *Figure 2*.

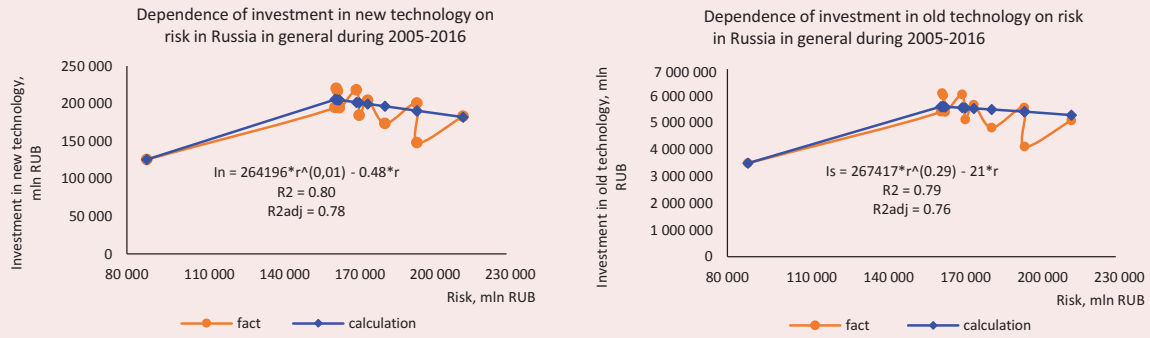
With the growing ratio of investment in new and old technologies, the level of technology increases. The level of technological effectiveness varies in a very narrow range. The narrowness of change range, of course, does not suggest that the technological level is very sensitive to risk and interest rate.

As you can see, investment in new technologies are more important for improving the technological level of manufacturing sector than transaction primary sector.

Investment in old technologies in Russia is much higher than investment in new technologies, setting the investment composition that does not contribute to a significant increase

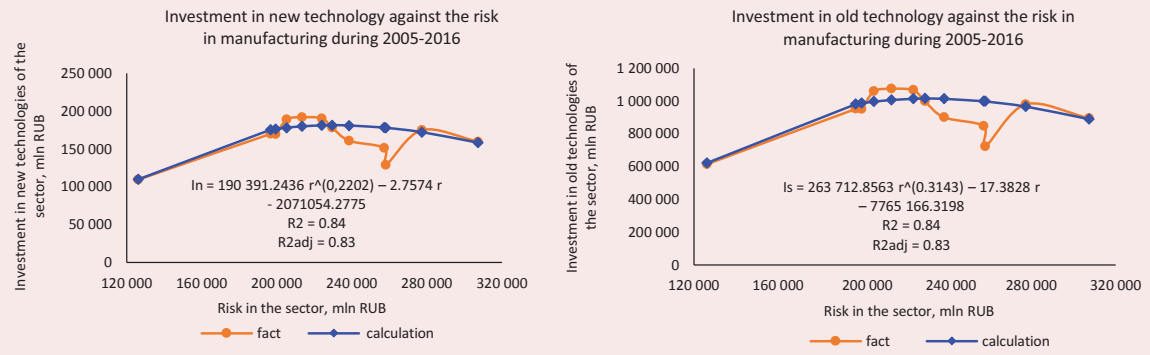
[6] Production volume based on new technologies – volume of shipped innovative goods, works and services. Volume of production based on old technologies – total volume of shipped products minus shipped innovative products.

Figure 3. Investment in new (left)* and old technologies (right)** and risk to the Russian economy, 2005–2016



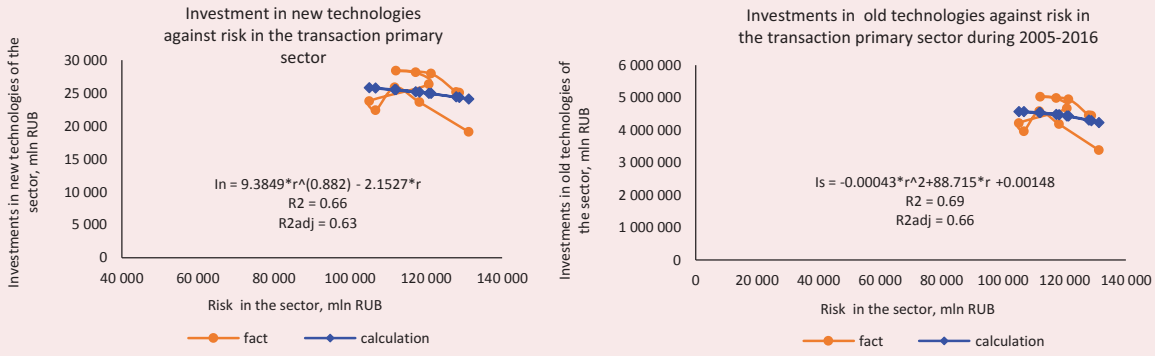
* Statistics: F-criterion= 31.5; D-W criterion= 1.69 ∈ [1.33; 2.67]; White test: $\chi 2$ calculation (1.35) < $\chi 2$ critical (3.8).
** Statistics: F-criterion= 26.8; D-W criterion= 1.45 ∈ [1.33; 2.67]; White test: $\chi 2$ calculation (2.76) < $\chi 2$ critical (3.8).

Figure 4. Investment in new (left)* and old technologies (right) ** and risk to manufacturing sector, 2005–2016



* Statistics: F-критерий = 58,1; D-W критерий = 1,64 ∈ [1,33; 2,67]; тест Уайта: $\chi 2$ расчет. (1,81) < $\chi 2$ крит. (3,8).
** Statistics: F-criterion= 56.1; D-W criterion= 1.46 ∈ [1.33; 2.67]; White test: $\chi 2$ calculation (1.93) < $\chi 2$ critical (3.8).

Figure 5. Investment in new (left)* and old technologies (right)** and risk to manufacturing sector, 2005–2016



* Statistics: F-criterion= 39.6; D-W criterion= 1.33 ∈ [1.33; 2.67]; White test: $\chi 2$ calculation (3.4) < $\chi 2$ critical (3.8).
** Statistics: F-criterion= 36.7; D-W criterion= 1.41 ∈ [1.33; 2.67]; White test: $\chi 2$ calculat ion (2.2) < $\chi 2$ critical (3.8).

Source: calculated based on: Rosstat collection "Russia in Figures" for 2006–2017, section "Enterprise financial activity" (Fig. 3–5).

in technological effectiveness (*Fig. 3–5*), with the risk increase significantly minimizing investment in new technologies and reducing investment in old technologies.

In manufacturing, the correlation between investment in new and old technologies and risk in the sector is similar to the graphs for the Russian economy (numerical values, of course,

are different. For transaction primary sector, investment in new technologies is more than 100 times less than in old technologies, with higher investment corresponding to higher risks. With increased risks, there is still a decrease in investment in this sector in the period under consideration, both in new and old technologies (the results were obtained for the Russian economy during 2005–2016)).

Thus, the problem of technological renewal of the Russian economy is reduced to straightening the investment composition between new and old technologies and industries, increasing the overall technological level in economic sectors [2–3, 11–13, 22]. This requires a change in the institutional environment, in particular, a reduction in risks in manufacturing and increases risks in transaction primary sector. The objective of concentrating the development resource is addressed not only by attracting reserves, assets of the banking system, changes in the fiscal policy towards lending to manufacturing industries, but also by organizing the resource overflow from expanded transaction primary sector to manufacturing. This overflow will increase investment in new technologies and may improve the technological efficiency of manufacturing. We demonstrate the opportunities of such management as a way to achieve medium- and long-term goals of technological development by calculating the sensitivity of investment in new and old technologies to risk and interest rates as management parameters (specific tools of the economic policy).

We present the obtained dependence parameters obtained during the econometric study, linking risks and interest rates in manufacturing and transaction primary sectors and the Russian economy, as well as investment in new and old technologies on risk magnitude in each sector.

Correlation between risks and interest rates:

A) for the Russian economy: $r = 2096.3579\ i + 152\ 724.7726$[7]

B) in manufacturing: $r = 12997\ i + 87\ 224$[8]

C) in transaction primary sector: $r = 5430\ i + 56\ 967$[9]

Correlation between investment in new (In) and old (Is) technologies and risks[10]:

A) for the Russian economy:

$In = 264195.6752\ r^{0.0056} - 0.4756\ r$

$Is = 267\ 416.9011\ r^{0.2931} - 20.9689\ r$

B) in manufacturing:

$In = 190\ 391.2436\ r^{0.2202} - 2.7574\ r - - 2071054.2775$

$Is = 263\ 712.8563\ r^{0.3143} - 17.3828\ r - - 7765\ 166.3198$

C) in transaction primary sector:

$In = 9.3849\ r^{0.882} - 2.1527\ r$

$Is = -0.00043\ r^2 + 88.71503\ r + 0.00148$

Now let us prent the models obtained for technological effectiveness (γ – ratio production volume based on new technologies to production volume based on old technologies in sectors under review and the economy of Russia) from the ratio of investment in new and old technologies:

A) for the Russian economy: $\gamma = 0.3980\ (In/Is)^{0.6855}$

B) in manufacturing: $\gamma = 0.3116\ (In/Is)^{1.0169}$

C) in transaction primary sector: $\gamma = 0.8207\ (In/Is)^{0.9169}$

Let us show the sensitivity of investment in new and old technologies to the tools of economic policy (risk and interest rate) and technological effectiveness.

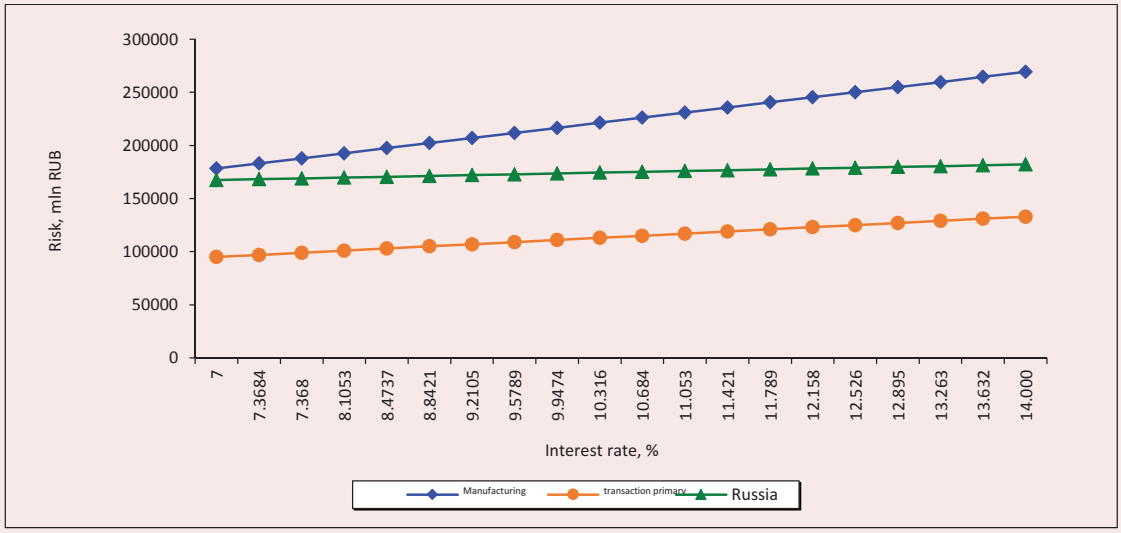
[7] Statistics: F-criterion = 5.4; D-W criterion = 1.34 $\in$ [1.33; 2.67]; White test: $\chi 2$ calculation (1.31) < $\chi 2$ critical (3.8).

[8] Statistics: F-criterion = 4.98; D-W criterion = 1.84 $\in$ [1.33; 2.67]; White test: $\chi 2$ calculation (1.43) < $\chi 2$ critical (3.8).

[9] Statistics: F-criterion = 22; D-W criterion = 1.47 $\in$ [1.33; 2.67]; White test: $\chi 2$ calculation (2.04) < $\chi 2$ critical (3.8).

[10] For other dependencies, statistics are presented in Figures 3–5.

Figure 6. Risk and interest rate (manufacturing, transaction primary sector, TP, Russia's economy)



Source: calculated by: http://www.cbr.ru/statistics/?Prtid=int_rat&ch=PAR_222#CheckedItem.

Figure 6 shows changes in risk depending on interest rate for the Russian economy. Risks in the Russian economy increases slightly with an increased interest rate from 7 to 14%. However, in manufacturing and transaction primary sectors it grows faster, with the manufacturing sector significantly exceeding the risk in transaction primary sector.

If interest rate is reduced according to the obtained dependence parameters, risks in the sectors under review will decrease. Changes in the risk ratio, other than the interest rate, are influenced by internal conditions prevailing in each sector, as well as general economic changes.

Increased risk in manufacturing is faster with growing interest rate than in transaction primary and significantly exceeds risks in the Russian economy, so that the difference in risk between sectors with an increased interest rate increases, with a decreased rate – it decreases. This affects the resource flow in the economic system because resource distribution (in particular, investment) is sensitive to risk.

Figures 7–8[11] demonstrate investment in new and old technologies in Russia based on risk and interest rate. With the growing interest rate and risk investment is reduced, and vice versa: with a decreasing – it is increased. Moreover, investment in old technologies is significantly higher than investment in new technologies and its sensitivity to changes in risks and interest rate is much higher.

Figure 9 demonstrates investment in new technologies from risk and interest rates for Russia's manufacturing sector.

Investment in new technologies in manufacturing is also not high, and with rising risks and interest rates it first slightly increases, then – decreases. This is due to the acceptance of risk in new results and technologies that are inherently risky, that is, investment increases, and this increase corresponds to the increasing risk. By increasing, the interest rate increases

[11] These and subsequent figures demonstrate empirical parameter values, according to actual data of specified parameters, the sources of which are listed above (see Fig. 2–6).

Figure 7. Investment in new technologies, risk (left) and interest rate (right), Russia

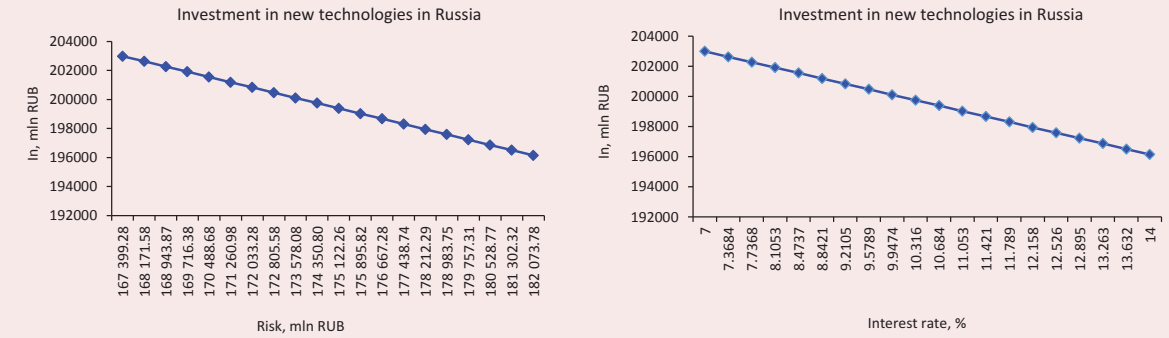


Figure 8. Investment in old technologies, risk (left) and interest rate (right), Russia

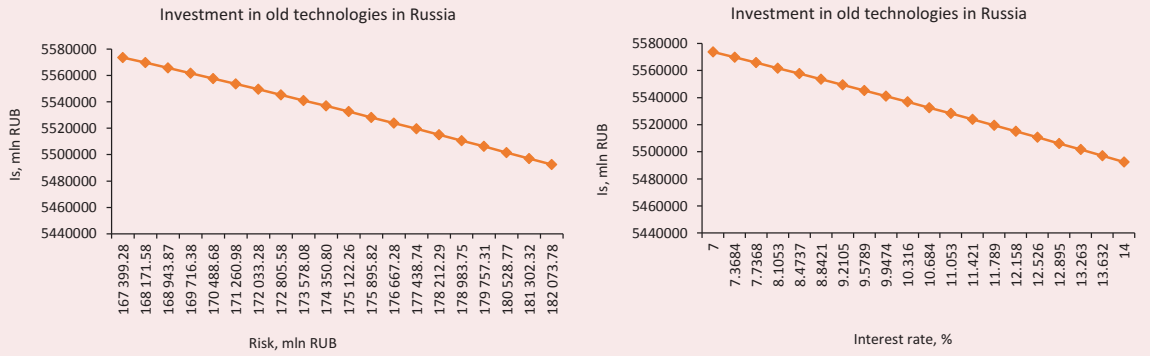
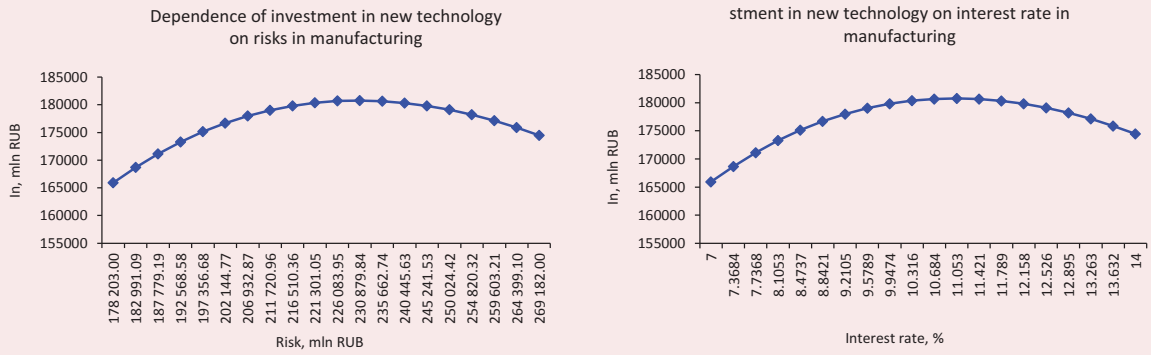


Figure 9. Investment in new technologies, risk (left) and interest rate (right), manufacturing



the risk. To some extent, investors take this risk (risk acceptance) but then, this investment is curtailed, new technologies are not introduced as the risk blocks this implementation.

Investment in old technologies in manufacturing is presented in *Figure 10*. The general nature of their changes is almost the same as investment in new technologies in manufacturing, but in old technologies investment is significantly higher.

In transaction primary sector, investment in new technologies changes from risk and interest rates in a different way than in manufacturing (*Fig. 11*). As interest rates and risk increase, investment decreases. The same is true for investment in old technologies in this sector.

Figure 10. Investment in old technologies, risk (left) and interest rate (right), manufacturing

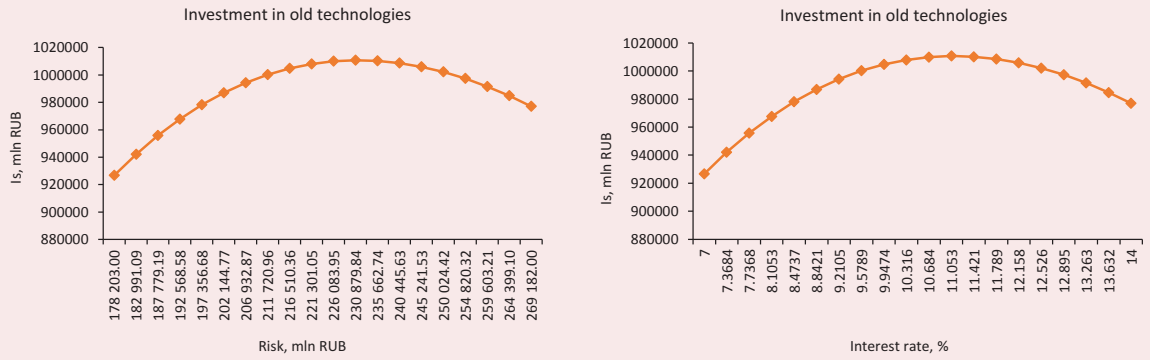


Figure 11. Investment in new technologies and risk (left), interest rate (right), transaction primary sector

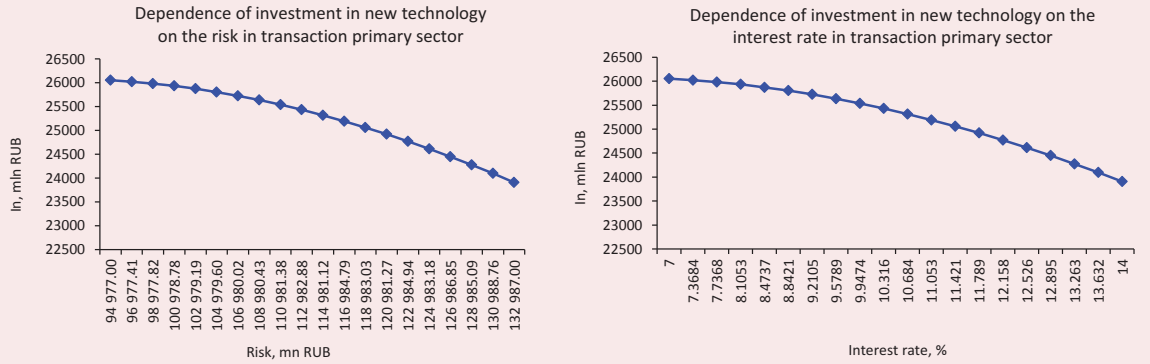
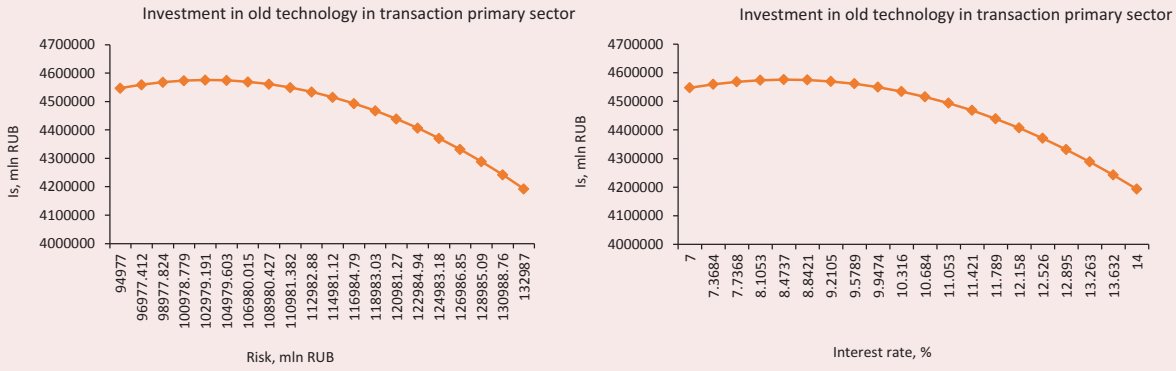


Figure 12. Investment in old technologies and risk (left), interest rate (right), transaction primary sector



And its reduction is quite fast, in the range from 7 to 14% (*Fig. 12*).

The total value of investment in the Russian economy decreases with the growing risk and interest rates, in manufacturing, investment performance repeats investment performance in new and old technologies. In transaction primary sector, total investment performance is similar to that in new and old technologies. There is a very small section of investment increase with the growing risk, then it is significantly reduced with the growing risk and interest rates.

With increasing risk and interest rates, the level of technological effectiveness decreases in manufacturing (*Fig. 13*), in transaction primary sector, with increasing risk and interest rate,

Figure 13. Technological effectiveness and risk (left), interest rate (right)

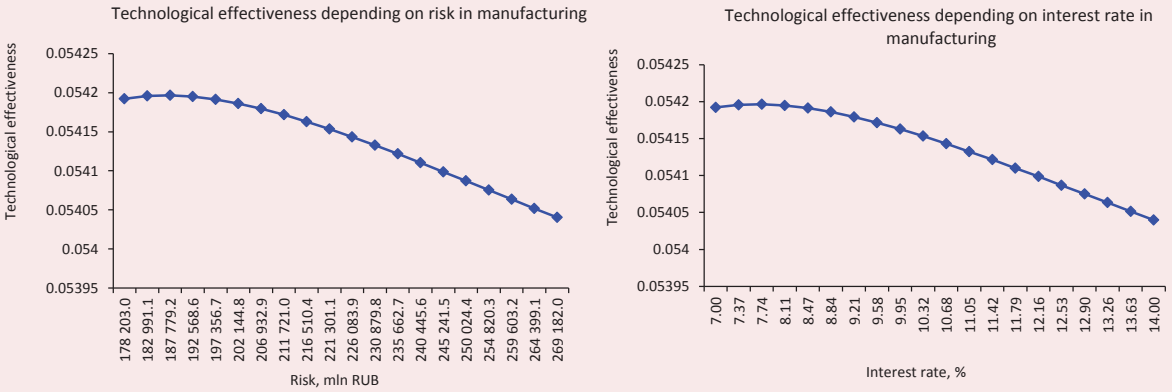


Figure 14. Technological effectiveness of transaction primary (TP) sector and risk (left), interest rate (right)

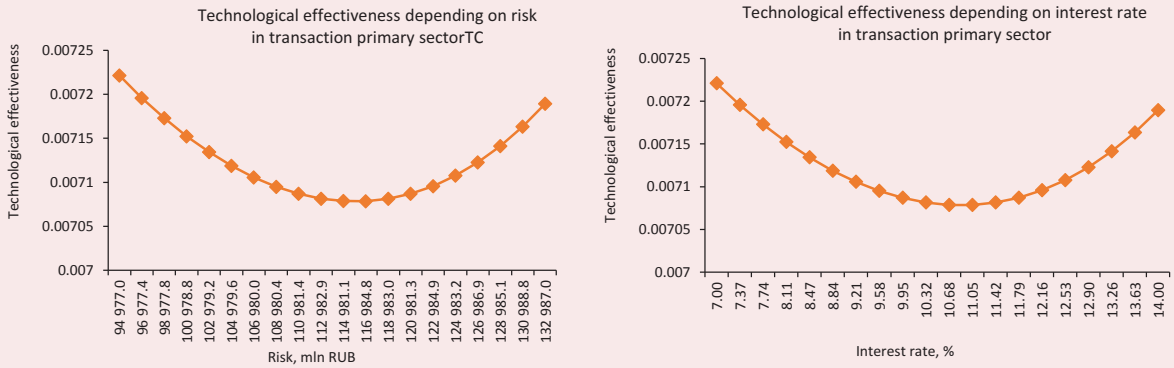
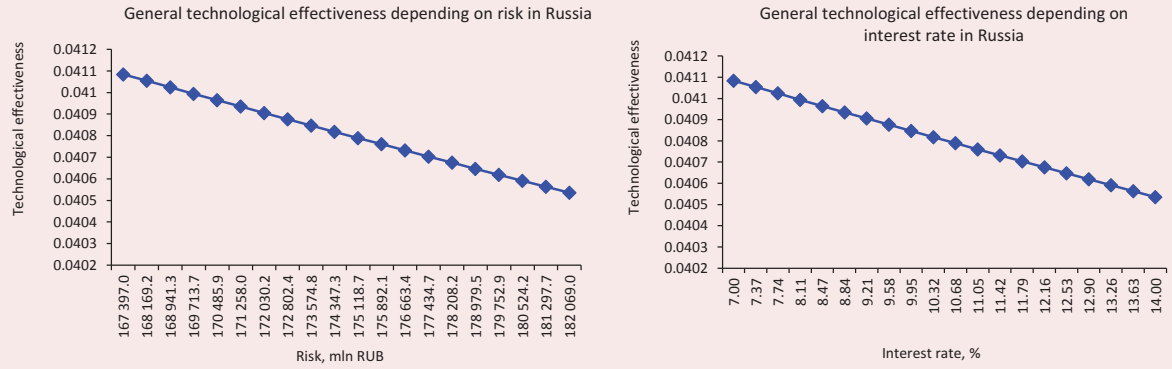


Figure 15. Technological effectiveness of the Russian economy and risk (left), interest rate (right)



technological effectiveness first decreases, then increases. For the Russian economy, an increase in risk and interest rate is accompanied by a decrease in the overall level of technological effectiveness (*Fig. 14–15*).

The level of technological effectiveness in manufacturing with a reduction in the interest rate below 7% practically equalizes the risk in manufacturing and transaction primary sectors (*Fig. 16*).

Figure 16. Risk and interest rate in the Russian economy and its sectors

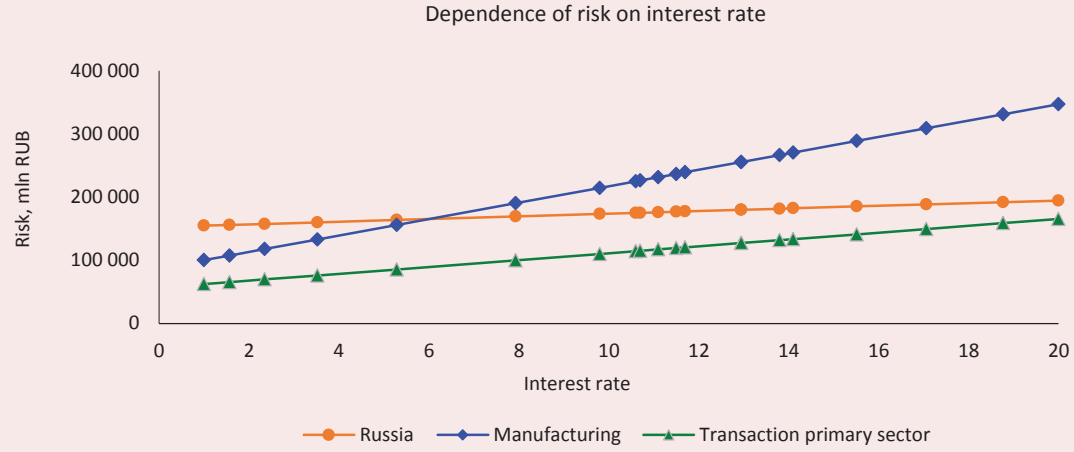
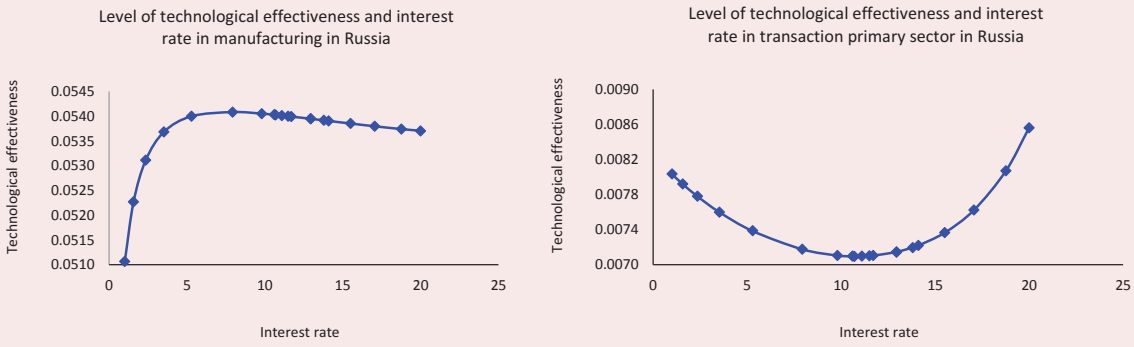


Figure 17. Technological effectiveness in manufacturing (left) and transaction primary sector (right) from interest rate



At a rate of interest above 5.5%, the risk in manufacturing becomes higher than the Russian level.

A decrease in the rate is accompanied by decreased risks. Of course, this model makes a significant assumption that risk depends on the interest rate, when it can be more determined by other factors. Therefore, for rigorous analysis it is necessary to reject factors according to their influence on risk. However, for the purpose of demonstrating the role of interest rate this model is enough.

In manufacturing and transaction primary sectors, the link between the level of technological effectiveness and interest rate is demonstrated in *Figure 17*.

As can be seen, at an interest rate of up to 8–10% in manufacturing with the growing interest the level of technological effectiveness increases. This sector corresponds to an increase in risk. Then, at a rate above 10% (risk above 200,000 million rubles) the level of technological effectiveness is reduced. It should be noted that the increase and decrease is extremely small, it occurs in a very narrow range of technological effectiveness.

This effect is probably due to the fact that having reached a certain level it is difficult to quickly reduce technological effectiveness by changing the interest rate. Moreover, the level of technological effectiveness is not high and varies by a small amount. In transaction

primary sector, at an interest rate of up to 10% the level of technological effectiveness decreases with the increasing rate (at the same time, it is lower than in manufacturing), then it increases with the growing interest rate, although insignificantly. Perhaps this is due to the fact that transaction primary sector, having a high interest rate, has great opportunities due to the speculative component to replace the applied technologies. For the Russian economy as a whole, the prevailing ratio is that with the growing interest rate there is a decrease in technological effectiveness.

Thus, in manufacturing sector, a low-range growth in interest rate, leading to increased risks reflects the growth of the sector and its investment, which itself is associated with an increase in demand for capital, an increase in interest rates and risks. Such a reaction is natural. With a higher rate and its increase, risks are also increased; the level of technological effectiveness is reduced, but gradually and slowly, until the technological capacities are exhausted. With low risks and low interest rate, investment in new and old technologies in manufacturing are increased, with higher risks and lower interest rates – it is decreased. The qualitative dependence for transaction primary sector is similar. However, investment in manufacturing increase the technological effectiveness, in transaction primary – declines, which is associated with the function of technological effectiveness for both sectors (decreasing return in transaction primary sector, increasing return – in manufacturing).

4. Conclusion

To sum up the results of the study we make some significant conclusions.

First, establishing a new growth model for the Russian economy can be due to changes in its technological structure set by new and old technologies and investment in them. This will require a shift of resources between manufacturing and transaction primary sectors. Taking into account the effect of investment distribution between different technological capacities has not yet been fully implemented in investment models, which increases the usefulness of the approach used in the article not only for diagnosing the current economic situation, but also from the point of view of specifying the objectives of technological development, with consequent actions in the economic policy. Theoretically, the influence of risk and interest rate as macro-parameters on the process of technological renewal is demonstrated.

Second, quantitative assessment confirms that the sensitivity of investment in new and old technologies is different to changes in risk and interest rates, which are the control parameters determining the amount of investment flow, hence, the scale of technological innovation in economic sectors.

Third, within the framework of the state planning system, the correlation between medium- and long-term goals of technological development (with the algorithm of their analytical definition – setting) is identified, with the differentiation of these goals in terms of changing the structure of old and new technologies, when there is a natural (stimulated) displacement of some technologies by others. Based on the reviewed groups of technologies (in the author's classification [11]), we proved the need to stimulate the creation of "superior", "neutralizing" and "adaptive" technologies, commensurating the ability to ensure the implementation and interaction of each of these types of technologies in the emerging conditions. The proposed algorithms make it possible to clarify the setting of economic development priorities in technology and reduce the level of unjustified changes in priorities and development goals.

Fourth, it is found that the level of technological effectiveness of the Russian economy quite weakly responds to changes in interest rate and risk, especially in manufacturing and transaction primary sectors. But the changes that we have managed to impose show that the growth of interest rate and risk act towards reducing the technological effectiveness will at least not significantly increase it. Of course, the level of technological effectiveness depends on many factors, including risk, however, if we assume a linear correlation between interest rate and risk (statistically, this dependence is quite reasonable), the overall impact will imply an increased interest rate in its low values accompanied by an increase in technological effectiveness in manufacturing. With a high share, the technological efficiency of manufacturing decreases with the growth of the interest rate. Transaction primary sector operates under the opposite model, as its technological effectiveness increases at a high interest rate, as the speculative nature (with the dominance of transaction activities) of this sector at a high interest rate expands the possibility of replacing technologies that have significant specific features compared to production technologies (used in manufacturing). Thus, empirical analysis establishes (from the actual data) that different interest rates may correspond to different levels of technological effectiveness.

Further research prospects include an opportunity to compare the levels of technological development in different countries, determining the impact of different macroparameters of the system on its change, including the sectoral aspect of the problem, as well as the structure of investment distribution in technological innovation.

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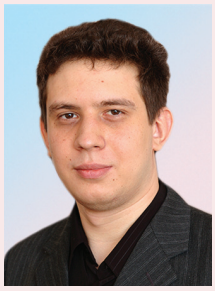
Inflow of Foreign Direct Investments in Russia's Regions: Potential and Risk Factors



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Abstract. The Russian economy is closely integrated with the world capital market and at the same time possesses visible regional differences in the dynamics of foreign direct investment (FDI). The goal of our research is to carry out quantitative assessment of the factors that promote the inflow of FDI to Russia's regions in 2011–2017 within the framework of aggregated and private indicators of risk and potential. The estimates we have obtained indicate that the aggregate investment potential has a positive impact on FDI inflows to the regions. We find out that as the risks for the domestic economy increase, the statistically significant inverse correlation between FDI inflows and the aggregate investment risk index ceased to be observed since 2014, alongside the remaining visible convergence between Russia's regions on this indicator. Our estimates suggest that without overcoming the high risks generated by the national economy as a whole, the reduction in aggregate risks between Russia's regions does not play a significant part in increasing FDI inflows. In accordance with our assessment, we determine that the regional dynamics of FDI inflows in 2011–2017 was explained by some private indicators of investment risk and potential, which, in general, had a reverse and direct impact on the dependent variable, respectively. The specific characteristics of Russia's regions significantly adjusted the importance and the ratio of FDI attraction factors, so the obtained values of the corresponding elasticities indicated a difference rather than a commonality of private indicators of risk and potential, the indicators that drive the inflow of direct investment to the Far East compared to other regions of Russia. This fact probably confirms the need for differentiated policies to attract FDI to the economy of the Far East in comparison with other

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regions. Since our research reflects the relative impact of risk and potential factors on FDI inflows for Russia's regions that exist in the single institutional and economic space, the estimates we have obtained can be supplemented by a more detailed study of the role of Russia's potential and risk compared to other national economies.

Key words: foreign direct investment, investment potential, investment risk, aggregate and private indicators, elasticity, fixed effects, Russia, region, Far East.

Introduction

Exchanging direct investment between economies is a key element of global investment cooperation. Being the most important source of technology and productive experience, foreign direct investment[1] (FDI), ceteris paribus, can have a long-term positive impact on the development of the national economy through various channels [2] contributing to the expansion of its foreign trade, employment growth, human capital development and overall productivity. From this point of view, assessment of the factors determining the dynamics of attracting FDI is an important research problem.

The Russian economy is closely integrated with the world capital market in terms of FDI, despite the fact that Russia is among the countries with high risks for economic activity. In 2011–2017, FDI inflows into the domestic economy amounted to about 1.7% of GDP, which was below the global level (2.1%). It is assumed that the reduction of risks can positively affect the growth of the Russian economy and attract FDI.

Research on FDI factors is based on various postulates, including interdisciplinary ones, demonstrating a variety of assessments. At the same time, there are at least two main approaches to the assessment of the factors that explain the dynamics of direct investment between economies. By analogy with trade interactions in the framework of the first approach, when studying direct investment flows, the gravitational dependence of mutual investments between economies is estimated. So far, a large number of studies have been accumulated that explain and predict the dynamics of direct investment on the basis of the gravitational approach for both the national [3] and regional levels [4].

The second approach is to identify key institutional and macroeconomic variables that explain the dynamics of investment flows. In this case, statistics of aggregate investment interaction of the economy with the outside world are sufficient to obtain quantitative estimates. Institutional variables in empirical studies under the second approach are usually identical to investment risk factors as a component of the so-called "investment ratings" of economies of various levels, which are regularly published by international (World Bank, Heritage Foundation, etc.) and many national specialized organizations and rating agencies. These ratings are based on recommendations for assessing the risk of the country [5], in the economy of which the investor intends to invest. In turn, in studies of this kind, it is important to assess the investment potential of certain economies determined by the size of their market, the purchasing power of the population, the availability of natural

[1] Direct investment is a type of cross-border investment under which the resident of one country controls or has a significant degree of influence on the management of an enterprise that is a resident of another country. For more detail, see: [1].

resources, etc. On the basis of estimates of this kind of ratings, describing both general and specific types of investment risks and potential, a sufficient number of empirical studies have been accumulated; the studies are devoted to: the causality between the flow of FDI and indicators of potential and risk [6]; the influence of constituent elements of the risk on aggregate FDI flows [7] or specific types of FDI [8]; community [9] in the framework of the various aggregates of national economies and the differences [10] between the groups of countries from the point of view of the impact of risks and potential for attracting FDI; the impact of risks impeding FDI on economic growth [11]; the relationship between the exports of direct investment abroad and risk [12]. Among the basic hypotheses of this kind of research, the presence of a direct relationship between the dynamics of investment interactions with indicators of investment potential and the inverse relationship between the flow of FDI and indicators of investment risk is tested. In most studies, these hypotheses are confirmed.

As is the case regarding Russia, the analysis of the available results of empirical studies of FDI factors should take into account that the dynamics of its macroeconomic indicators are characterized by significant volatility. Therefore, for different time periods, the results may differ from each other significantly. For example, when analyzing the impact of FDI on economic growth for one period, this relationship was not statistically confirmed [13], and for another time period, on the contrary, the direct impact of FDI on economic growth was found [14].

For the Russian economy, prospective estimates of drivers of FDI inflows and exports of direct investment abroad were obtained within the framework of the first approach (based on the application of gravity dependence) for both the national [15] and regional [16] levels. These studies determine that the actual values of foreign investment in Russia are significantly inferior to the potential values, and for the Eastern regions of the country the factor of remoteness from the capital was not significant.

As part of the second approach to the study of the drivers of FDI inflows and exports of direct investments abroad for the Russian economy, i.e. the indicators of investment risk and potential, the assessment was carried out for Russia as a whole [17], but in most cases – for its regions. Considering the Russian regions in the early 2000s, it has been found that the factors that can be attributed to the investment potential of the territories contributed to the attraction of FDI [18], and the variables associated with institutional risks restrained their inflow [19].

In the case of the Russian economy, the focus of research has subsequently shifted toward studying the differences in the behaviour of different types of FDI and the impact of factors that form the basis of modern governance institutions. For the regional level, the specifics of attracting FDI by different types were studied, in particular by belonging to the so-called "fictitious direct investment" from abroad[2]. Since the risks of investing in the Russian economy are high compared to most countries of the world [20], a significant share of total FDI in Russia has fallen to the share of "fictitious direct investment", which according to the studies [21] go to the regions rich in natural resources and to the regions with a high

[2] "Fictitious direct investment" is formed by the withdrawal of capital from the Russian economy to offshore territories and its subsequent return as FDI in order to reduce the risks associated with domestic law enforcement, as well as tax optimization of the corporate sector.

index of perception of corruption, focusing on the implementation of less technological projects in contrast to other FDI. Further, based on the statistics of FDI distribution by industry and assessment of the lagging influence of institutional factors, it has been shown that in the case of improving the quality of public administration institutions, the inflow of foreign capital to the Russian regions could increase [22].

Almost all studies of the Russian economy have found a statistically significant deterrent effect of variable risk on FDI inflows and a stimulating effect of investment potential on such flows. It should be noted that in the above studies for the Russian economy, the drivers of FDI inflows were estimated on the basis of Rosstat data, which differ significantly from modern statistics generated by the Central Bank of Russia due to the fact that these institutions use of different methods of data collecting. On the basis of the current data generated with the help of the balance of payments method, drivers of FDI inflows have not been investigated. The estimates were made for the dynamics of FDI inflows prior to the events of 2014, the consequences of which are likely to have a long-term impact on the intensity of attracting foreign capital to Russia[3]. As a result, there was an outflow of various types of capital from the Russian economy, and its assets significantly decreased in price.

The Russian economy, which has been characterized by high investment risks that were partially offset by the growth of the domestic market, now faces structural and institutional constraints. As uncertainty for economic agents increased, FDI inflows began to decline. At the same time, Russia is characterized by a variety of territorial socio-economic subsystems with significant differences in the specifics of FDI inflows.

As a hypothesis, it can be assumed that, despite the high risks and reduced potential for the Russian economy as a whole, the decrease in certain investment risks and the increase in potential at the regional level can have a positive impact on FDI inflows. Probably, at the level of regional subsystems, a single space of the national economy can distort the impact of a number of socio-economic processes, so different parts of the country may have differences in terms of factors that explain the attraction of foreign capital[4]. Perhaps, despite the high aggregation of FDI inflows attracted to Russia, the dynamics and regional distribution of this indicator can be explained by investment risk and potential indicators, which have the opposite and direct impact on foreign investment inflows, respectively.

It should be noted that over the past decade, the Russian government has begun to pay increased attention to the development of the regions of the Far East, which, in turn, despite a number of serious problems, have opportunities for development on the basis of available abundant natural resources and proximity to dynamically developing countries. It seems that attracting FDI can be one of the most important elements in accelerated development of the economy of this macroregion. On this basis, we can assume that there are visible differences between the regions of the Far East and the rest of Russia's regions in the potential and risk factors that explain FDI inflows.

[3] The introduction of sanctions against the Russian economy in connection with its political confrontation with a number of leading countries of the world; significant decrease in the prices of traditional Russian exports; significant devaluation of the national currency; decrease in real incomes; signs of a recession in the domestic economy.

[4] See, for example: [16].

The purpose of our study is to assess the drivers of investment potential and risk that influenced the attraction of FDI in the Russian regions in 2011–2017. The algorithm of the study includes the following stages: definiing an applied model for quantitative assessment, choosing and harmonizing statistical data; assessing the drivers of FDI inflows to the Russian regions (for the entire array of regions; for Far Eastern regions[5]; for Russian regions, excluding the Far East).

Assessment methodology and statistics

According to a number of studies [23; 24; 25], it is assumed that the dynamics of FDI inflows can be explained by inverse relationship with investment risk factors and direct relationship with potential factors. Based on this, the function of dependence of FDI inflows on the parameters of investment potential and risk of Russian regions can be represented as follows:

$$FDI = f(\frac{1}{RISK}, POTENTIAL), \quad (1)$$

where FDI is an indicator reflecting FDI inflows; $RISK$ – investment risk parameters; $POTENTIAL$ – investment potential parameters.

The dependence (1) is estimated using regression analysis methods. It is linearized by the following logarithm:

$$logFDI_{it} = \beta_0 - \beta_n LogRISK_{it} + \\ + \beta_m LogPOTENTIAL_{it} + \varepsilon_{it}, \quad (2)$$

where FDI_{it} is the amount of FDI inflows that the i-th region received in year t (in current prices, million USD). β_n – elasticity coefficients of FDI inflows to the i-th region in year t for the corresponding investment risk indicator; β_m – elasticity coefficients of FDI inflows to the i-th region in year t for the corresponding investment potential indicator.

As for FDI statistics, until 2013 it is formed on the basis of special forms that enterprises filled in; the forms were accumulated in the regional offices of Rosstat. The balance of payments methodology is then used to collect FDI statistics[6]. As a result, two temporary sets of FDI statistics – those generated by Rosstat and the Central Bank – are not comparable, since their values differ significantly (Rosstat data are much smaller [26]). The most affordable way to obtain this kind of assessment is to use the Central Bank's statistics on attracted FDI for the period 2011–2017 in the framework of operations in Russian constituent entities in which residents are registered according to the balance of payments data. Thus, for objective reasons, there is no possibility of disaggregation of the FDI indicator by industry, geographical structure, and consequently, by institutional characteristics.

At the first stage of our study we used the rating indicators of investment risk of Russian regions, which are evaluated by Expert Rating Agency[7] with the involvement of a pool of experts from representatives of domestic and foreign businesses operating in Russia; we also used the indicator of the potential that reflects the size of the economy – GRP in constant prices[8]. These indicators were used to explain

[5] The assessment was conducted for nine regions of the Far East as of 2017.

[6] Statistical data, divided by regional flows, are available from 2011, by geographical and sectoral structure – from 2015.

[7] In addition to the data on risk provided by Expert Rating Agency there are rating indicators developed by OPORA RUSSIA, but they cover less than half of the Russian regions, two of which are Far Eastern, so they will not be used in the present study.

[8] The potential is characterized by the values of real GRP due to the fact that the data reflecting the share of Russian regions in the all-Russian investment potential, estimated by Expert Rating Agency, had a weak correlation with the inflow of FDI into Russian regions.

the dynamics of FDI inflows to the Russian regions in a number of other empirical studies [19; 21].

At the second stage more specific indicators can be applied to examine in more detail the impact of risk and capacity indicators on FDI inflows. Disaggregation of indicators of investment risk and potential of Russian regions was carried out on the basis of the methodology for ranking the investment attractiveness of Russian regions by RAEX-Analitika company [27].

According to this methodology, regional investment risk consists of the following private risks (groups of indicators[9]): economic, socio-demographic, financial, managerial, environmental and criminal. The indicators describing *economic risk* include statistics that characterize financial loss of organizations, the share of loss-making enterprises, the degree and proportion of depreciation of fixed assets, the profitability of goods sold, both in aggregate form and by economic activity. *Socio-demographic risk* is characterized by indicators in the field of healthcare, labor market tensions, living standards, the number of internally displaced persons, mortality, the number of road accidents, as well as ethnic characteristics of the region. *Financial risk* reflects the overall level of financial stability of the business, including the financial performance of organizations, debt of organizations and individuals on loans and deposits in rubles and foreign currency, the level of accounts payable and receivables, including overdue. *Management risk* is reflected in the relative number of employees of state bodies and local governments, the ability to attract investment in fixed assets estimated through their relationship with GRP, the quality of budget planning and execution, as well as the current debt burden of regional budgets, the degree of their dependence on transfers from the federal budget, the ability to provide a minimum level of necessary social services. Indicators characterizing the *environmental risk* reflect the level of environmental pollution through emissions into the air, discharges of contaminated wastewater into surface water bodies, etc. *Criminal risk* characterizes the level of crime, both in aggregate form and for various types of offenses.

Similarly, the investment potential of the regions is characterized by the following components of its potential: *natural resource* (availability of basic types of natural resources); *demographic and labor* (population size, population density, size of the labor market and its quality characteristics); *production* (indicators characterizing the volume of production of goods and services by economic activity); *consumer* (people's income and consumer spending); *infrastructure* (density of roads, access to the Internet, cost of fixed assets, power plants, commissioning of houses, etc.); *innovation* (the volume of innovative goods, works and services, the number of employees in research organizations, financial costs of R&D, the number of patent applications, their issuance, etc.); *institutional* (performance results of small enterprises, the number of enterprises and organizations, features of economic activity of joint ventures and enterprises related to private property, the volume of services provided by financial and insurance organizations, etc.); *financial* (budget revenues, balanced financial result of organizations, income accumulated by the population); *tourist* (number of hotels and restaurants, tourist flow). Due to the fact that FDI are accumulated in the regions in most

[9] In our study they are presented as indicators due to the lack of opportunity to carry out the procedure of weighting partial indicators of risk and potential via expert method.

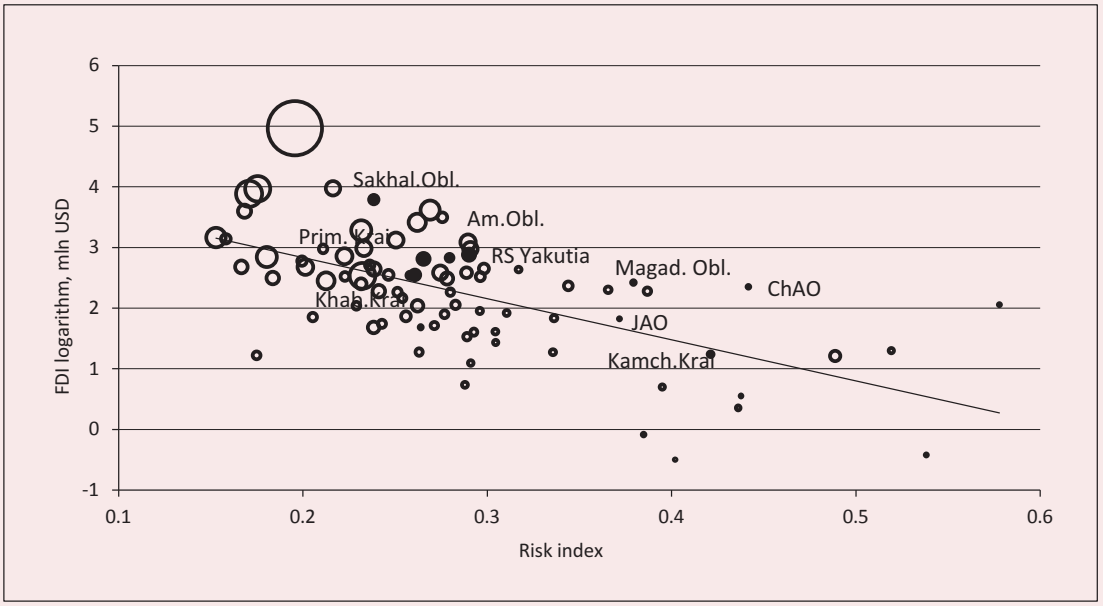
cases with the purpose of exporting products outside the territory of their operation, usually abroad, the list of indicators of the investment potential of the region is expanded to include data on *the openness to the markets that are external for Russia*; these data are reflected in the ratio of trade indicators with foreign countries to GRP and the amount of foreign workforce attracted.

Thus, the basic set of variables for the second stage included more than 800 indicators that reflect private indicators of risk and potential of the Russian regions based on the data of Rosstat, Expert Rating Agency, the Central Bank, the Ministry of Finance, the Treasury, as well as various relevant ministries and departments of Russia. The initial set of indicators is presented by statistics for seven years (2011–2017) for 82 subjects of the Russian Federation (regions)[10].

Results of assessing the drivers of FDI inflows into Russian regions

Assessing the drivers of FDI inflows into Russian regions: risk index and real GRP. The dispersion charts indicate that there exists an inverse relationship between FDI inflows and the investment risk index and a direct relationship for the potential indicator (both for the whole population and for the regions of the Far East). This, in turn, suggests that investment risk and potential indicators may have a statistically significant impact on FDI inflows into Russian regions over the period under review *(Figure)*.

The risk index and the flows of FDI into the Russian regions



Note. The figure presents average values of the indicators for 2011–2017. The size of the circle corresponds to the size of GDP (in prices of 2011, mln RUB). Far Eastern regions are indicated as black circles.

Source: Rosstat, calculations by Expert Rating Agenxy and the Central Bank of Russia.

[10] The following are excluded from the analysis: the Republic of Crimea and the federal city of Sevastopol due to the lack of statistical data until 2014; Nenets Autonomous Okrug – due to the presence of zero observations of the dependent variable. The Tyumen Oblast and its constituent autonomous districts are represented as separate regions.

Table 1. Results of assessing the drivers of FDI inflows into Russian regions: the risk index and the real GRP

Period	All regions			Far Eastern regions			Other regions		
	2011–2017	2011–2013	2014–2017	2011–2017	2011–2013	2014–2017	2011–2017	2011–2013	2014–2017
Risk index	-1.44* (0.37)	-1.55* (0.12)	-0.64*** (0.31)	-3.12* (0.89)	-6.00* (1.95)	-1.26 (2.06)	-1.70* (0.37)	-2.90* (0.75)	-1.31 (0.89)
GRP	1.64* (0.10)	4.54* (1.31)	3.66*** (2.07)	0.86* (0.31)	9.48* (1.58)	7.31* (2.21)	1.72* (0.10)	3.42** (1.65)	3.31*** (2.00)
Constant	-17.68* (1.01)	-54.10* (16.30)	-42.27*** (25.79)	-8.72** (3.00)	-116.1* (21.37)	-84.73* (25.99)	-19.31* (1.02)	-42.04** (20.34)	-39.02 (25.95)
Number of observations	574	246	328	63	27	36	511	219	292
Fixed effects for regions	no	yes	yes	no	yes	yes	no	yes	yes
Fixed effects for years	yes	yes	yes	yes	yes	yes	yes	yes	yes
R^2	0.54	0.84	0.84	0.42	0.73	0.73	0.60	0.88	0.90
F-test	86	17	22	5.1	7.0	4.7	94	14	26
p-value	0	0	0	0	0	0	0	0	0

Note. Standard error values are given in parentheses; * – p<0.01, ** – p<0.05, *** – p<0.10. Taking into account the fixed effects for the regions, statistically significant estimates of the first differences were obtained only for the period of 2011–2013.
Source: own calculations.

On the basis of dependence (2), the corresponding elasticities were estimated on the basis of panel data with fixed effects for regions and for years *(Tab. 1)*.

The estimates partially confirmed the assumption of our study: the potential of the regions contributed to the inflow of FDI into them. For 2011–2017, the investment risk index reflected an inverse correlation concerning FDI inflows into Russian regions, but without taking into account regional features. The assessment has shown that since 2014, a statistically significant relationship between FDI inflows and the investment risk rating is no longer observed.

Since 2014, various risks for the Russian economy as a whole have tended to increase, thus it moved into the group of countries with a low quality of institutions and high risks for investment, which are mainly associated with foreign policy risks, law enforcement risks and the economic system. A detailed analysis of the data reflecting the dynamics of the investment risk index for the regions of Russia has shown that its median value was decreasing, i.e. according to this indicator a convergence between Russian regions was observed. This, in turn, is an indirect confirmation of the fact that the reduction of risks within the economic system is not enough to mitigate the significant negative image formed by foreign investors for the national economy as a whole.

In accordance with the estimates, we observed that the Far East was different from other Russian regions from the point of view of influence of the drivers on FDI inflows. The elasticity of FDI inflows in terms of investment risk in 2011–2013 for the Far Eastern regions was more than twice as high as for the rest of the Russian regions. On the one hand, the estimates suggest that in order to increase FDI inflows into the Far East, the risks that impede

foreign direct investment should be reduced compared to other more successful regions of Russia. On the other hand, sincec 2014 the index of investment risk was not statistically significant, which indicates the need for evaluation of particular indicators of risk. For the Far Eastern regions, elasticity of incoming FDI in terms of the potential was on average more than two times higher than the value of the elasticity for other Russian regions. And since 2014, the value of this elasticity for the Far East has decreased, and for other Russian regions it remained approximately at the level of previous years. The estimates obtained may indicate that there is a significant difference between the Far Eastern regions and the rest of the regions in the private indicators of investment risk and potential that determine FDI inflows.

Assessing FDI inflows into Russian regions: private indicators of risk and potential. According to the descriptive statistics of the indicators under consideration, there is a high variation between the regions of Russia in a number of indicators related to the dependent and independent variables. Therefore, in order to take into account the specific features of the dependent variable, the evaluation was carried out with fixed effects for both time and spatial objects – regions. An important task was to find such indicators that would be statistically significant for the entire analyzed period of time (2011–2017) both for the whole set of regions and for two groups (Far Eastern and other Russia's constituent entities)[11]. The indicators were evaluated according to their statistical significance and content from the whole array of variables. One of the main criteria for the selection of independent factors was the absence of signs of multicollinearity and heteroskedasticity in regressors. The absence of signs of autocorrelation for regression was a secondary criterion.

The evaluation has shown that the inflow of FDI in the regions of Russia for 2011–2017 can be described by only a few partial parameters of risk and potential. Risk factors did constrain FDI attraction, and potential factors (with the exception of attracted foreign workforce) contributed to the inflow of foreign capital into the Russian regio5689ns *(Tab. 2)*.

According to the calculations, the inflow of FDI into the regions was facilitated by the indicators of innovation potential and foreign trade openness (the ratio of trade turnover with foreign countries to GRP). The indicator of the potential of the economy's openness to foreign markets – the foreign labor force attracted – was characterized by an inverse correlation with the dependent variable, probably due to the presence of substitution between foreign labor and capital in the market of Russian regions. Indicators relating to criminal, financial, socio-demographic and environmental risks were impeding FDI. The greatest (modulo) values of elasticities were observed in the indicators of criminal and socio-demographic risk. Other indicators, including those characterizing economic and management risk, were not statistically significant.

The next stage of the study was to confirm or deny the existence of a visible difference in the factors determining FDI inflows between the Far East and the rest of the Russian regions. For this purpose, the factors of FDI inflows into the regions of Russia with the exception of the Far East *(Tab. 3)* and in the Far Eastern regions *(Tab. 4)* were estimated.

[11] The assessment was carried out within the framework of dependence (2) according to the decomposition of risk and potential factors.

Table 2. Results of the assessment of FDI inflows into all regions of Russia

Variable	Models		
	1	2	3
Criminal risk indicator *(RISKcrime1)*	-0.94* (0.25)	-0.92* (0.25)	-0.89* (0.24)
Financial risk indicator *(RISKfin)*	-0.16* (0.04)	-0.16* (0.04)	-0.15* (0.04)
Innovation potential indicator *(POTENCIALinn)*	0.15* (0.05)	0.15* (0.05)	0.16* (0.05)
Indicator of potential of openness to external markets *(POTENCIALopen1)*	0.44* (0.14)	0.42* (0.14)	0.39* (0.14)
Socio-demographic risk indicator *(RISKsoc1)*	–	-0.95*** (0.49)	-0.81*** (0.48)
Criminal risk indicator *(RISKcrime2)*	–	-0.54*** (0.32)	–
Socio-demographic risk indicator *(RISKsoc2)*	–	–	-0.99** (0.40)
Environmental risk indicator *(RISKecol)*	–	–	-0.74** (0.31)
Indicator of potential of openness to external markets *(POTENCIALopen2)*	–	–	-0.61* (0.16)
Constant	8.08* (1.20)	13.29* (2.68)	22.99* (3.36)
Number of observations	574	574	574
R^2	0.87	0.87	0.88
DW	2.24	2.27	2.27
F-test	34.62	34.24	35.12
p-value	0	0	0

Notes: 1. Tables 2, 3 and 4 show three possible models within the regression dependence (2): the first model is the main one; the second and third models are evaluated to determine the impact of additional independent non-correlated variables on FDI.
2. Standard error values are given in parentheses; * – p<0.01; ** – p<0.05; *** – p<0.10. *RISKcrime1* – change in the number of registered crimes (murder and attempted murder, lag in % of the previous year); *RISKcrime2* – the number of crimes committed by minors and with their complicity (in % of the total number of crimes); *RISKfin* – the amount of loss of organizations (million dollars); *RISKsoc1* – the number of road accidents and victims (per 100 thousand people); *RISKsoc2* – the number of registered unemployed (thousand people); *RISKecol* – emissions of pollutants into atmospheric air from stationary sources (thousand tons); P*OTENCIALinn* – the volume of innovative goods, works and services (in % of the total volume of shipped goods, performed works and services); *POTENCIALopen1* – the ratio of trade turnover with foreign countries to GRP, %; *POTENCIALopen2* – the number of foreign labour force, people.
Source: own calculations.

If we compare the results of the corresponding elasticities in *Tables 3* and *4*, then we find a difference rather than a similarity between the drivers of FDI inflows into the Far East and other Russian regions. Moreover, if we compare the estimates obtained in Tables 3 and 4 with the estimates in Table 2 (for all regions of Russia), we see the existence of a visible distinction according to independent variables between the two groups of regions.

In terms of explaining FDI inflows into the Far East and the rest of Russian regions, only two factors were common (see Tables 3 and 4). First, it is the indicator of financial risk that impedes FDI inflows and reflects the amount of loss of organizations; this indicator has a large modulus of elasticity for the Far East compared to other regions Based on the dynamics of the loss that organizations experienced in 2011–2017, we can conclude that for the Far East,

Table 3. Results of the assessment of the drivers of FDI inflows into other regions of Russia

Variable	Models		
	1	2	3
Criminal risk indicator *(RISKcrime1)*	-0.84* (0.26)	-0.82* (0.26)	-0.86* (0.26)
Socio-demographic risk indicator *(RISKsoc1)*	-1.22* (0.42)	-1.29* (0.42)	-1.27* (0.41)
Financial risk indicator *(RISKfin)*	-0.10** (0.04)	-0.10** (0.04)	-0.10** (0.04)
Indicator of potential of openness to external markets *(POTENCIALopen1)*	0.31** (0.13)	0.32** (0.04)	0.26** (0.04)
Socio-demographic risk indicator *(RISKsoc1)*	–	-0.82*** (0.48)	–
Indicator of potential of openness to external markets *(POTENCIALopen2)*	–	–	-0.55* (0.17)
Infrastructure and production potential indicator (*POTENCIALinfrprod*)	–	–	1.01* (0.33)
Ecological risk indicator (*RISKecol*)	–	–	-0.53*** (0.31)
Constant	10.65* (1.58)	14.72* (2.87)	13.78* (2.96)
Number of observations	511	511	511
R^2	0.89	0.89	0.89
DW	2.19	2.21	2.21
F-test	41.36	41.07	41.77
p-value	0	0	0

Note. Standard error values are given in parentheses; * – p<0.01; ** – p<0.05; *** – p<0.10. *RISKcrime1* – change in the number of registered crimes (murder and attempted murder, lag in % of the previous year); *RISKsoc1* – the number of road accidents and victims (per 100 thousand people); *RISKsoc1* – the number of road accidents and victims (per 100 thousand people); *RISKsoc2* – the number of registered unemployed (thousand people); *RISKfin* – the amount of loss of organizations (million dollars); *RISKecol* – emissions of pollutants into atmospheric air from stationary sources (thousand tons); *POTENCIALopen1* – the ratio of trade turnover with foreign countries to GRP, %; *POTENCIALopen2* – the number of foreign labour force (people); *POTENCIALinfrprod* – index of physical volume of investments in fixed capital (in comparable prices; in % of the previous year).
Source: own calculations.

this indicator on average restrained the inflow of FDI by 17.3%, for the rest of the regions of Russia – only by 2.4%. The economy of the Far East was very sensitive to the recession in the national economy, which, in turn, restrained the inflow of FDI. From this point of view, the current profitability of business, which is reflected in the minimization of losses[12], is one of the key factors in the inflow of FDI into the economy of the Far East, unlike other regions of the country.

Second, the attracted foreign labor force as an indicator of the potential for openness to foreign markets had a deterrent effect on FDI inflows into the Far East and other regions of Russia. According to the estimates, foreign labor and capital are likely to be substitutes: an increase in the number of foreign labor by 1.0% led to a decrease in FDI for the Far East by 1.14%, for the rest of the Russian regions – by only 0.53%. An assessment of disaggregated statistics on FDI and foreign labour by type of economic activity and geographical structure may provide a more detailed analysis of the relationship between these indicators.

[12] The net financial performance of organizations could not be estimated within the framework of dependence (2) due to the presence of zero and negative values. Evaluation of this indicator in the form of semi-elasticity gave a similar result in terms of the direction of the impact.

Table 4. Results of the assessment of the drivers of FDI inflows into the regions of the Far East

Variable	Models		
	1	2	3
Criminal risk indicator (*RISKcrime2*)	-3.08*** (1.54)	-3.00*** (1.49)	-3.22*** (1.48)
Economic risk indicator (*RISKecon*)	-1.10** (0.50)	-1.09** (0.48)	-1.22** (0.48)
Financial risk indicator (*RISKfin*)	-0.67* (0.18)	-0.64* (0.17)	-0.73* (0.17)
Innovation potential indicator (*POTENCIALinn*)	0.32* (0.10)	0.30* (0.10)	0.34* (0.10)
Indicator of potential of openness to external markets (*POTENCIALopen2*)	–	-1.14*** (0.57)	–
Institutional potential indicator (*POTENCIALinst*)	–	–	7.71** (3.65)
Constant	12.44* (2.29)	22.53* (5.57)	-59.80*** (34.30)
Number of observations	63	63	63
R^2	0.82	0.84	0.84
DW	2.38	2.49	2.52
F-test	10.72	11.06	11.23
p-value	0	0	0

Note. Standard error values are given in parentheses; * – p<0.01; ** – p<0.05; *** – p<0.10. *RISKcrime2* – the number of crimes committed by minors and with their complicity (in % of the total number of crimes); *RISKecon* – the proportion of fully worn-out fixed assets (mining activities) (%); *RISKfin* – the amount of loss of organizations (million dollars); *POTENCIALinn* – the volume of innovative goods, works and services (in % of the total volume of shipped goods, performed works and services); *POTENCIALopen2* – the number of foreign labor force (persons); *POTENCIALinst* – the number of enterprises and organizations (lag).Source: own calculations.

Further, it is necessary to explain the impact of other factors on FDI inflows for two groups of regions, and in more detail – for the Far East.

As for other regions of Russia (see Tab. 3), FDI inflows were promoted by the indicators of the potential for openness to external markets and infrastructure and production potential; the increase in these indicators by 1.0% led to an increase in foreign capital by 0.3 and 1.0%, respectively[13]. In addition to the impact of the above-mentioned financial risk indicator and the attracted foreign labor force indicator (as one of the indicators of the potential for openness to external markets), indicators related to criminal, socio-demographic and environmental risks had a deterrent effect on FDI inflows into other regions of Russia. For the regions outside the Far East, the greatest modulo values of elasticities were observed in the indicators of socio-demographic and criminal risk, which, perhaps, should be considered as a reflection of part of the structural and institutional problems in the national economy.

The indicators of criminal and economic risk were the factors that impeded the inflow of FDI into the Far Eastern regions, (see Tab. 4). According to Rosstat, the Far East has long been a leader in the number of offenses per capita. Probably, for this reason, the elasticity of the indicator of criminal risk has a relatively high value (modulo) and it is possible that the decrease (modulo) by 1.0% ceteris paribus is able to have a positive impact on the inflow

[13] Here it is necessary to point out that unlike the situatin in the Far East, the overall FDI inflows into other regions have tended to decline.

of FDI, increasing it by 3.2%. However, in this case we should note that the statistical significance of this indicator is relatively low.

The assessment has shown that economic risk for the Far East was represented by only one statistically significant indicator (see Tab. 4), it reflects the proportion of fully depreciated fixed assets in economic activity related to mining. Due to the narrowness of the macro-regional consumer market, FDI is concentrated in the primary economic sector that is mainly associated with the extraction of minerals: fuel and energy (mostly localized in the Sakhalin Oblast and in the Republic of Sakha (Yakutia)) and other mineral resources (precious, non-ferrous and ferrous metals). The increase in the extent of depreciation of fixed assets in the field of specialization of most regions of the Far East is an indicator of the subsequent decline of regional economies, which negatively affects the expectations of investors both in Russia and abroad, contributing to the decline in investment activity in the territory. The increase in depreciation of fixed assets in the mining sector also indicates a decline in the competitiveness of the industry, which does not encourage additional flows of financing, including FDI. Perhaps, the dynamics of depreciation of fixed assets in the mining sector is an indirect indicator of the exogenous process for the Far Eastern economy, reflecting the dynamics of the external situation concerning the demand for a range of commodities: for example, since the end of 2014[14] due to the fall in world prices for a number of commodities, subsequent investments in the expansion and renewal of production capacities in the Far East have been postponed for some time. In the Far Eastern regions in 2011–2017 the increase in the proportion of fully depreciated fixed assets in the sector associated with the mining operations was on average 6.1% per year, which hampered the inflow of FDI by 7.5% on average.

According to the assessment, the variable that reflects institutional potential had a positive impact on attracting FDI to the Far East (see Tab. 4); this variable is characterized by a change in the number of enterprises and organizations and reflects the development of the process of competition/monopolization in the market of the Far Eastern regions. During the period under consideration, the growth in the number of enterprises averaged 1.0% per year, this fact contributed to an increase in FDI inflows into the Far East by an average of 7.7%. The indicator of innovative potential (the share of innovative goods, works and services[15] in the total volume of goods shipped and works and services performed) for the Far East was statistically significant and had a positive impact on FDI inflows. The impact of this factor is small: a 1.0% increase in the share of innovative products in total shipments contributed to an increase in FDI inflows by only 0.3%. The indicator of innovative potential can be understood as a certain feature of the dynamics of economic development of the macroregion: with the growth of the economy there is a proportional increase in the share of innovative products, probably due to the growth of imports of goods, services and technologies and creation of new goods, works and services on their basis. We should note that after 2014 this figure practically did not increase in all regions of the Far East.

[14] In world markets, the downward trend in prices of some commodities (ferrous and non-ferrous metals) has been observed since 2011.

[15] According to the methodology used to compile this indicator, it includes goods, works and services that are new or have undergone various technological changes over the past three years.

The impact of socio-demographic, management and environmental risks on FDI inflows into the Far East was not found to be statistically significant. We assumed that the inflow of foreign investment will be closely interrelated with the indicators of the intensity of foreign trade activity in the regions of the Far East. However, we have not found such a connection for the Far East, probably due to the fact that the real trade turnover between the macroregion and foreign countries is not fully reflected in the statistics[16].

Conclusion

The estimates partly confirmed a number of assumptions of the present study: the investment potential of the Russian regions contributed to the inflow of FDI into them. At the same time, a statistically significant correlation between FDI inflows and the investment risk index ceased to be observed since 2014, because various risks for the Russian economy as a whole began to increase, thus shifting it to a group of countries with low quality institutions and high risks for investment. In terms of the investment risk index, we observe a convergence between the Russian regions. It follows that, in order to increase FDI inflows, an average reduction in aggregate risks between regions is clearly not sufficient to overcome the high risks generated by the national economy as a whole.

The Russian economy is characterized by visible regional differences in the dynamics of direct investment flows from abroad. Regional dynamics of FDI inflows in 2011–2017 were explained by some private indicators of investment risk and potential, which in general have a reverse and direct impact on the dependent variable, respectively.

The inflow of FDI into the Russian regions was facilitated by the indicators of innovation potential and foreign trade openness. The indicator of the potential of the economy's openness to external markets – the foreign labor force attracted – was characterized by an inverse relationship with FDI, probably due to the substitution between foreign labor and capital in the market of the Russian regions. The iIndicators relating to criminal, financial, socio-demographic and environmental risks have hampered FDI. The greatest (modulo) values of elasticities were characteristic of criminal and socio-demographic risk indicators.

The specific features of Russia's territorial subsystems significantly adjusted the significance and ratio of FDI inflows; consequently, the obtained values of the corresponding elasticities indicated a difference rather than a community of private risk and potential indicators explaining FDI inflows into the Far Eastern regions compared to other Russian regions. Probably, this fact confirms the necessity to implement a more differentiated policy to attract FDI in the economy of the Far East compared to other regions.

First, indicators of the potential for openness to external markets and infrastructure and production potential contributed to attracting FDI to other regions of Russia. Indicators related to criminal, socio-demographic and environmental risks had a deterrent effect on FDI inflows in other regions of Russia. For them, the greatest modulo values of elasticities were characterized by indicators of socio-demographic and criminal risk, which can be considered as a reflection of structural and institutional problems in the national economy.

[16] The available statistics do not reflect the flows of goods of the companies of federal importance engaged in mining, vertically integrated companies in the fuel and energy sector, defense enterprises and facilities that ensure national security of the country. It should also be noted that there are certain specific features in the sales of precious metals produced in the Far East, including those produced by joint ventures and organizations with 100% foreign capital.

Second, in terms of explaining FDI inflows into the Far East and other regions of Russia, only two factors were described by similar indicators. The financial risk indicator, which reflects the amount of loss of organizations, was the main deterrent to FDI inflows into the Far East, unlike other regions of Russia. It was estimated that foreign labor and capital were probably substitutes.

Third, indicators of criminal and economic risk were factors that impeded FDI inflows into the Far Eastern regions. It is likely that a decrease in the crime rate in the macroregion, ceteris paribus, could have a positive impact on FDI inflows. The economic risk for the Far East was presented as an indicator reflecting the share of fully depreciated fixed assets in economic activities related to mining, being the second most impacting factor limiting FDI inflows.

Fourth, the variables of innovation and institutional potential had a positive impact on attracting FDI to the Far East. The indicator of innovation potential can be understood as a certain feature of the dynamics of economic development of the macroregion, while the impact of this factor was small. The variable of institutional potential, characterized by the dynamics of the number of enterprises and organizations, reflected the development of competition in the market of the Far Eastern regions, contributing to an increase in FDI inflows into the Far East by an average of 7.7% per year. At the same time, it is necessary to identify the process of increasing monopolization of the macroregion's market, manifested in the replacement of regional business by large federal owners, the reduction in the share of independent small and medium-sized producers in the raw materials industries of the Far East in recent years.

In recent years, business opportunities for foreign direct investors in the Russian market in the existing institutional and market conditions are significantly limited, which is caused, among other reasons, by changing the rules of the game[17]. As for the fears of the corporate sector that it could suffer from sanctions imposed on the Russian economy, they probably cause the need to register investment flows through offshore territories. However, these risks cannot be identified on the basis of the statistics and tools we use, because these risks are exogenous for spatial objects and represent the general institutional (including sanctions-related) background for the entire Russian economy. This, in turn, is an additional constraint on FDI inflows, which can be explored in detail in a subsequent study. As statistics become available, we find it important to assess the impact of risk and potential on foreign direct investment inflows that are not "fictitious direct investment", as these investments are expected to be the most sensitive to the volatility of the indicators under consideration.

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[17] See for example: [28].

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Evaluating Digital Ecosystems in Russia's Regions*

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Abstract. Successful establishment and functioning of the digital economy is possible only in an adequate digital ecosystem, but the semantic and structural content of this system has not been defined adequately yet. Such uncertainty can be found at different levels (federal, regional and local) and in various aspects: subject-related, branch, segment, technical and others. At the same time, the need to implement effective measures for the development of regional digital ecosystems requires not only an understanding of their qualitative content, but also an accurate quantitative assessment. Our paper analyzes conceptual approaches to the definition of a digital ecosystem, provides our own understanding of its full content, which allows us to build a sufficiently verifiable assessment of digital ecosystems development at the regional level. We present a technique for assessing the development of regional digital ecosystems; according to this technique two integrated indices are calculated, and on this basis we carry out an analysis on 82 constituent entities of Russia over the period of two years. The study reveals the existence of significant differentiation between the regions according to the level of development of digital ecosystems; it also helps identify a number of characteristic types of regions in this context. Our assessment has shown that, along with the majority of the regions where the development of digital ecosystems is defined as average, some regions show opposite trends. There are regions, for example, the Belgorod and Kirov oblasts, in which the conditions for the digital environment are below average, but the level of ecosystem development in them is average or higher. There are regions where the situation is the opposite, i.e. the conditions are quite high, but the level of development of the digital ecosystem as a whole leaves much to be desired. Such a negative example is the Moscow Oblast. We also identify leading regions and problem regions. We hope that a reliable assessment of development of digital ecosystems using our technique will help work out effective solutions for successful promotion of the digital economy in Russia.

Key words: digital economy, ecosystem of the digital economy, index of activity of the subjects of digitalization, digitalization conditions index, assessment of the level of development of digital ecosystems, regions digitalization matrix.

Introduction

2017 was a breakthrough year for the development of the digital economy in Russia. The digital economy has become a key topic of the Russian President's speech at the Saint Petersburg International Economic Forum 2017; in his speech the President pointed out that Russia needed to increase its technological, personnel and intellectual advantages in the field of the digital economy. The President said it was necessary to create a flexible regulatory framework to introduce digital technology in all spheres of life, taking into account the information security of citizens, businesses and the state. Russia's policy aimed at digitalization was confirmed by the establishment of the Digital Economy Development Fund "Digital Platforms". The Fund promotes industry-specific digital platforms, the research on directions and technologies of the digital economy, participation in the elaboration of state and professional development programs, etc., and participates in the approval of two important strategic planning documents in mid-2017: the strategy for the development of the information society in the Russian Federation for 2017–2030[1] and the program "Digital economy of the Russian Federation"[2]. Both

[1] Strategy for the development of the information society in the Russian Federation for 2017–2030: approved by the Decree of the President of the Russian Federation of May 9, 2017 No. 203. Available at: http://kremlin.ru/acts/bank/41919 (accessed: 26.05.2018)

[2] Program "Digital economy of the Russian Federation": approved by the Resolution of the Government of the Russian Federation of July 28, 2017 No. 1632-r. Available at: http://static.government.ru/media/files/9gFM4FHj4PsB79I5v7yLVuPgu4bvR7M0.pdf (accessed: 27.05.2018).

strategic documents pay great attention to the formation of the digital economy ecosystem. However, we can name only a few currently existing definitions of this new phenomenon, due primarily to its lack of maturity and insufficient scientific elaboration. In addition, modern Russian scientific literature contains virtually no works on the assessment of the digital ecosystem development in Russia, taking into account the existing features and realities. In this regard, the goals of our study are as follows: to identify the nature and content of "digital ecosystems", to develop and test their assessment methods and to carry out pilot analysis of their development in Russia's regions. At the same time, the high level of socio-economic differentiation of the territory of the Russian Federation makes it necessary and highly relevant to assess the formation of ecosystems of the digital economy at the regional level; the information obtained will help elaborate recommendations for their development.

Review of conceptual approaches, and research methodology

At the state level, the term "digital economy ecosystem" is understood as a partnership of organizations that provide continuous interaction of their technological platforms, applied Internet services, analytical systems, information systems of public authorities of the Russian Federation, citizens and organizations. This definition is given in the strategy for the development of the information society in the Russian Federation for 2017–2030. A similar definition is proposed by representatives of the Center for Macroeconomic Analysis and Short-Term Forecasting: according to D.R. Belousov, the digital economy ecosystem is a system of "subjects that are interacting, exchanging digital resources and transforming their kinds into different ones" [1, pp. 6-17]. The subjective approach to understanding the ecosystem of the digital economy focuses on the actors that promote digitalization, but does not pay attention to the conditions in which they operate. From this point of view, a scientific article headlined "Digital economy: Conceptual architecture of a digital economic sector ecosystem" is of particular interest; in it, the authors give the following definition of the digital industry ecosystem: "It is an environment that provides conditions for the innovative development and distribution of digital services, digital products, applications and devices in a particular sector of the digital economy" [2, pp. 17-28]. As we can see, the emphasis in this definition is already shifted toward the conditions of digitalization, but it remains unclear who ensures the development and distribution of digital products and services. Another definition of the ecosystem is formulated in a research conducted by the Russian Association of Electronic Communications (RAEC) – a non-profit organization that unites more than 150 vendors of the Russian electronic communications market. In the presentation of the report on the results of the 2017 study, the digital economy ecosystem is presented as "those segments of the market where value added is created with the help of digital (information) technologies". RAEC proposes to consider the digital economy ecosystem through its decomposition into seven hubs: 1. State and society; 2. Marketing and advertising; 3. Finance and trade; 4. Infrastructure and communications; 5. Media and entertainment; 6. Cybersecurity; 7. Education and human resources[3]. This approach reduces the digital economy ecosystem to digital segments of

[3] *Annual report of RAEC "The economy of Runet 2017".* Available at: http://raec.ru/upload/files/de-itogi_booklet.pdf (accessed: 20.05.2018).

the market, while in reality the subjects of the digital economy interact with other sectors (in particular, science, energy, innovation sector, etc.). The level of digitalization of the economy is no less dependent on the development of these segments. In our opinion, it is necessary to get a broader interpretation of the concept of the digital economy ecosystem, the interpretation that follows from the generally accepted definition of "ecosystem" in the natural sciences. The term "ecosystem" was coined by ecologist A. Tansley to refer to jointly living organisms and their conditions of existence, which are in a natural relationship with each other [3].

Using the method of analogy and the subject, environment and segment approaches, we put forward an idea that the digital ecosystem should include the subjects of digitalization and the digital environment that creates conditions for the development of the digital economy and digital society. In our opinion, "digital ecosystem" is a multi-structural relationship between the main actors of the digitalization of the economy (population, state, business) and the basic conditions of their functioning.

Based on the objectives of the program "Digital economy of the Russian Federation", the digital economy ecosystem, in which data in digital form is a key factor in production in all areas of socio-economic activity, is intended to ensure effective interaction of business, academia, educational community, government and citizens. Thus, business represented by entrepreneurs, and people and government represented by public authorities are those who act as major subjects of the digital economy [4]. Often the interests of these actors are determined in opposition to each other and are in conflict. In order to eliminate and smooth the contradictions, science proposes many concepts, including sustainable development [5; 6], corporate social responsibility [7; 8, pp. 87-90; 9, pp. 81-84], the theory of stakeholders [10; 11, pp. 418-422] and others. In our opinion, the concept of shared value is of the greatest interest in the context of our study. M. Porter and M. Kramer, the founders of the concept [12, pp. 72-86; 13, pp. 62-77], define it as a system of policies and operational practices that enhance a company's competitiveness while improving the economic and social conditions of the communities in which it operates. Regarding the development of the digital economy, the concept of shared value helps ensure a balance of interests of business (using new software and information tools to increase the productivity of companies; online sales of goods and services, all this contributes to the reduction of costs, etc.), authorities (electronic document management that helps reduce material and time costs of management; reducing communication costs, etc.) and people (using information technologies that provide new opportunities for training and communication; receiving services in electronic form, contributing to the minimization of time costs, etc.).

On the basis of the concept of shared value and having identified the main stakeholders, we propose to include the following areas in the assessment of the level of digitalization of Russian regions:

1. Digital activity of the population [14, pp. 295-304].

Citizens who have access to the Internet and the necessary skills to use it can participate in a wide range of online activities. This may involve the use of online content (such as news, music, video or games, multimedia content, or interactive social events) through modern communication activities (such as social media, e-mail, Skype) or through digital opportunities

for e-commerce. People who use the Internet to order banking services, money transfers, insurance services, to carry out operations with shares and other securities save their time and money significantly.

2. Digital activity of organizations [15, pp. 218-229].

Digitalization is the main factor in competitive advantage of organizations and in promoting their economic indicators. The introduction of digital technologies can improve the efficiency of production of goods and services, reduce costs or provide closer interaction with customers, employees or business partners and becomes a mandatory requirement of competitiveness. This, along with the possibility of using the Internet as a sales point, makes a significant contribution to the modernization of business.

3. Digitalization of the state [16, pp. 221-236].

Interaction of organizations and citizens with the public sector can be simplified and raise its quality with the use of digital technologies. Public authorities can use digital technologies to cope more efficiently with the increasingly complex needs of business and citizens, while significantly reducing costs. And thanks to the more efficient and streamlined public services, citizens and organizations receive public services of a better quality and with minimal time costs.

In our opinion, in addition to the interaction of the subjects of digitalization (business, people and government), the digital ecosystem includes six most important conditions for the existence of the digital economy and digital society; these conditions form a kind of "digital environment". Let us consider each of the six conditions in more detail.

1. Digital infrastructure is considered one of the most important conditions for the digitalization of the economy and society; this idea is contained in the state program "Digital economy of the Russian Federation" and in the Information Security Doctrine of the Russian Federation approved by the Decree of the President of the Russian Federation of December 5, 2016 No. 646. Scientists [17; 18, pp. 907-932] and specialists of the information industry also point out special importance of the development of digital infrastructure. For instance, Andrei Vorobyov, director of the Coordination Center for TLD RU/.РФ, notes that a stable and sustainable operation of the infrastructure plays a key role in the digitalization process: "Like it was two centuries ago, when economic development of the region depended on the roads that were suitable for horse-drawn vehicles, and a century ago – on railroads, nowadays communication plays a key role. Only in the digital way of life the place of railways and motor roads is occupied by information dissemination channels". Thus, the deployment of a unified system of telecommunication channels, providing digitalization of the telephone network and the access to high-speed broadband Internet services, is one of the most important factors in the digitalization of the economy and society.

2. Digital competences of the population. These, according to the HSE Institute for Statistical Studies and Economics of Knowledge, include people's skills in the use of personal computers, the Internet and other types of information and communication technologies, as well as people's desire to acquire ICT competencies, knowledge and experience[4]. Digital competencies range from the basic skills people need to use digital technologies effectively for personal,

[4] HSE Institute for Statistical Studies and Economics of Knowledge. Available at: https://issek.hse.ru/news/207284687.html (accessed: 30.05.2018).

educational and work purposes, to the advanced or professional skills required to develop and create new digital goods and services and increase productivity through the use of digital technology. At the same time, the basic competencies that allow a person to become part of the digital society, learn new knowledge swiftly and adapt to new non-standard activities remain crucial. Thus, basic digital competence of the population, expressed primarily in the skills of using a personal computer and the Internet, are now a necessary condition for human competitiveness in the digital economy.

3. Digital education. Digital competences of the population are particularly dependent on the level of development of the educational system. Today, Russia is to achieve an ambitious national goal – to establish universal digital literacy. The most important role in this process belongs to higher education, since nowadays an individual simply cannot obtain it (unlike other levels of the educational system) without possessing at least basic digital competencies. Higher education also plays a crucial part in increasing the number of specialists in the field of digital economy. From all the above it follows that the development of the digital economy in our country largely depends on the effective operation of the higher education system, including the implementation of digital education programs and the availability of the necessary equipment, resources and facilities.

4. Spatial and territorial structure. The development of the digital economy is also significantly influenced by the spatial and territorial structure, in particular the level of urbanization and development of the territory. The importance of urbanization of the territory is explained by fact that at present the cities concentrate major technological, information and intellectual resources. The state program "Digital economy of the Russian Federation" provides for the implementation of a number of measures to create "smart cities", in which the central place will belong to the digital technologies for managing energy, water resources, public transport, etc.

Much attention in the development of the digital economy and society should be paid to the development of the territory. In terms of population density and land availability, Russia is an underdeveloped country. We should note that the well-developed and densely populated areas of North Caucasus and the Moscow agglomeration contrast with the undeveloped expanses of the North, Siberia and the Far East [19, pp. 85-91]. This greatly complicates and increases the cost of development of the digital infrastructure, makes it impossible to include the population of remote and inaccessible areas in the information society. The solution to these problems can be found in the accelerated (with governmental participation) formation of information infrastructure: the development of this infrastructure will form IT-frameworks, which are likely to be somewhat different from the territorial and spatial framework of the current settlement systems; this fact can provide an incentive for their development. Subsequently, the integration of digital technologies that emerge and function in "smart cities" will form a "smart settlement system" [20, pp. 68-74; 21, pp. 9-20; 22].

5. Development of science and innovation. In addition to legal regulation, personnel and education, information infrastructure, and information security, the five areas of development of the digital economy that the state program "Digital economy of the Russian Federation" defines as basic ones include the formation of research competencies and technological capacities. Research and innovation is one of the main drivers of economic development in the modern world.

Thus, innovations in the field of computer technology, which have transformed the sphere of telecommunications, provided the opportunities for creation and development of e-mail, social media and messengers, which, in turn, have become a powerful impetus to the formation of the digital economy.

6. Availability of resources. Energy is one of the most important resources for the development of the digital economy. Powerful computers, transactions of payment systems and other digital processes require significant energy costs. In this respect, the territories characterized by energy surplus have certain competitive advantages in the development of the digital economy. Financial resources are another important resource, crucial to the development of any sphere of society. The transition of the Russian economy to digital technologies will require significant investments. The significant costs for creating a digital infrastructure, the high rate of obsolescence of digital equipment, and long terms of training highly qualified personnel – all this necessitates considerable amount of expenditures on the part of both the state and business.

Research methodology

We have analyzed the existing approaches to the assessment of the digital economy. As a result, we have selected four international methodologies on the basis of which we carry out a cross-country comparison:

1. The Digital Planet 2017[5] methodology developed by Bhaskar Chakravorti and Ravi Shankar Chaturvedi at The Fletcher School of Law and Diplomacy. Within its framework, the authors assess the state and pace of development of the digital economy in the world. The Digital Evolution Index they have developed includes 170 indicators grouped into four main drivers:

- supply conditions (Internet access and degree of infrastructure development);
- demand conditions (people's demand for digital technology);
- institutional environment (governmental policy, legislation, resources);
- innovation and change (investment in research and start-ups).

In 2017, having calculated the Digital Evolution Index for 60 countries, the authors created the DEI Chart that classifies countries into four distinct trajectory zones: Stand Out (both highly digitally advanced and with a high pace of digitalization), Stall Out (with a high state of digital advancement while exhibiting slowing momentum), Break Out (low-scoring in their current states of digitalization but evolving rapidly), Watch Out (face significant challenges with their low state of digitalization and low momentum).

2. The European Commission methodology for calculating the Digital Economy and Society Index[6]. The DESI is composed of five principal policy areas which regroup overall 34 indicators: Connectivity (fixed broadband, mobile broadband, fast and ultrafast broadband and broadband prices), Human capital (basic skills and internet use, advanced skills and development), Use of internet service (Citizens' use of content, communication and online transactions), Integration of digital technology (Business digitisation and e-commerce), and Digital public services (eGovernment and eHealth).

[5] *Digital Planet 2017. How competitiveness and trust in digital economies vary across the world. Report*. The Fletcher School, Tufts University. Available at: https://sites.tufts.edu/digitalplanet/files/2017/05/Digital_Planet_2017_FINAL.pdf

[6] *The Digital Economy and Society Index (DESI). Final Report*. European Commission. Available at: https://ec.europa.eu/digital-single-market/en/desi

Table 1. Analysis of techniques for assessing the digitalization of the economy (information society) at the regional level

Name and authors of the technique	Brief description	Advantages	Disadvantages
Technique for assessing the level of development of the information society in constituent entities of the Russian Federation (Institute for Development of the Information Society; Ministry of Digital Development, Communications and Mass Media)*	The aim is to monitor the level of development of the information society in constituent entities of the Russian Federation and to build a rating of regions on its basis. The integral index of development of the information society consists of two components: "Drivers of development of the information society" and "Use of ICT for development". Includes 58 indicators.	The first comprehensive attempt to assess digital ecosystems (not only ICT, but also information society development factors). The use of indicators in international rankings. Easy interpretation of the results.	The complexity and cost of methods (too many indicators, difficulties in the collection and calculation of the individual indicators). Insufficient substantiation of the applied reference values. Information society development factors are limited by human, scientific, and educational potential and by the development of digital infrastructure; Duplication of a number of indicators (e.g. "Share of households with a personal computer (PC)" and "Number of PCs per 100 households, units"). The use of outdated indicators that do not reflect the level of development of the information society (for example, "Proportion of households with the landline"). The fact that the rating includes federal cities with "extreme" values for most indicators, which leads to distortion of the results. Lack of substantiation of the weighting factors for calculation of the integral index.
Technique for assessing the results of development of information and communication technologies in regions of the Russian Federation (M.Yu. Karyshev) [23, pp. 74-82]	The aim is to assess the results of development of information and communication technologies in regions of Russia and to arrange them into groups depending on the values of composite indices. The ICT Development Index calculating technique, which was adapted and supplemented in accordance with the specifics of statistical accounting in the Russian Federation, is taken as a basis. It includes two composite indices: the ICT Development Index, which includes the sub-index of ICT access, the sub-index of ICT use and the sub-index of core skills, and the Information Economy Development Index, which includes the sub-index of computerization of workplaces, the sub-index of network access, the sub-index of software applications, and the sub-index of energy security.	Adaptation of ICT Index (ICT Development Index – IDI) to Russian realities. Cost-effectiveness in the collection of statistical data for the calculation of the indices. Assessment of individual factors that influence the development of the information society through the calculation of the Information Economy Development Index (energy development, access to the Internet). The ranges of the indices from 0 to 1. that are understandable for the interpretation of the results	Lack of consideration of the whole range of factors that influence the development of the information society. The use of outdated indicators that do not reflect the level of development of the information society (for example, "Number of landline telephones per 100 people", "Number of centers for collective use of the Internet, units per 10 thousand people").

* Technique for assessing the level of development of the information society in constituent entities of the Russian Federation. Institute for Development of the Information Society; Ministry of Digital Development, Communications and Mass Media. Available at: http://minsvyaz.ru/ru/documents/4949/ (accessed: 27.05.2018).

Source: own elaboration based on the technique for assessing the level of development of the information society in constituent entities of the Russian Federation developed at the Institute for Development of the Information Society, Ministry of Digital Development, Communications and Mass Media and on the research by M.Yu. Kartashev "Statistical technique for measuring the information economy: finding the integral indicator".

3. ICT Development Index – IDI[7] (International Telecommunication Union). Goals: to measure the status and level of development of information and communication technologies (ICT) in the world.

The ICT Development Index is a comprehensive indicator consisting of 11 indicators combined into three sub-indices: infrastructure development and access to ICT (Access Index), ICT use (Use Index), and ICT skills (Skills Index).

4. Networked Readiness Index – NRI[8].

This index can be used as a tool to analyze and build comparative ratings that reflect the level of development of the information society in different countries. It measures the information capabilities of 129 countries included in the index by 67 parameters arranged into three main groups: the environment for ICT development; the readiness of citizens, business and public authorities to use ICT; and the usage of ICT in the non-governmental, commercial and public sectors. The methodology for calculating the index is based on three main factors: environment, readiness and use of ICT. Each index factor is an aggregated sub- and micro-index indicating the weight of the criteria calculated on the basis of statistical and expert indicators and the number of indicators of each sub-index.

However, in our opinion, these methods have a number of disadvantages:

a) the indicators used by these methods are not available in regional statistics;

b) the indicators cannot be applied to the Russian Federation, since Russian statistics do not keep records of a number of indicators;

c) index values are non-comparable with the values of previous years (calculation methods are constantly changing);

d) the methods do not take into account the differences between countries in their area and geography, the features essential for the development of ICT.

Speaking about digital ecosystems of the territories, we should note the lack of methods for their integrated assessment that allows us to compare regional ecosystems. Possible analogues of such techniques, their pros and cons are presented in *Table 1*.

Our research has allowed us to develop a methodological framework for assessing digital ecosystems of Russia's regions. With the help of this technique it is possible to differentiate constituent entities of the Russian Federation both by the level of activity of the subjects of digitalization and by the degree of favorable conditions for its development. For these purposes, we propose two indices: the Index of activity of digitalization subjects of the region (Id), which determines the pace of digitalization in the subjects of the ecosystem, and the Index of digitalization conditions in the region (Idc). Thus, these two indices make it possible to assess the level of development of regional digital ecosystems as a whole.

The index of activity of digitalization subjects of the region is calculated on the basis of 17 indicators selected in accordance with the areas of digital activity of the population, digitalization of organizations and the state. In turn, the index of digitalization conditions in the region includes 14 indicators that characterize the most important conditions of digitalization *(Tab. 2)*.

[7] *ICT Development Index. Report.* United Nations International Telecommunication Union. Available at: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume1.pdf

[8] *Networked Readiness Index, NRI. Global Information Technology Report.* World Economic Forum. Available at: http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/

Table 2. Classification of indicators to calculate the indices

Indicators within the Index of activity of digitalization subjects of the region (Id)		
Digitalization area	Sub-area	Indicator
1. Digital activity of the population	1.1 Access to broadband Internet	1.1.1 Number of active subscribers of fixed broadband Internet access, units per 100 people
		1.1.2 Number of active subscribers of mobile radiotelephone communication using broadband Internet access, units per 100 people
	1.2 Purposes of using the Internet	1.2.1 Downloading movies, music, images; watching videos; listening to music or radio, %
		1.2.2 Finding information about products and services, %
		1.2.3 Phone calls or video conversations via the Internet, %
		1.2.4 Participation in social media, %
		1.2.5 Sending or receiving e-mails, %
	1.3 Transactions on the Internet	1.3.1 People who use the Internet to order banking services, money transfers, insurance services, transactions with shares and other securities, % of the total population aged 15–72 who use the Internet to order goods and services
2. Digital activity of organizations	2.1 Electronic document flow	2.1.1 Use of electronic document management in organizations. Organizations using electronic data exchange between their own and external information systems, according to the exchange formats, %
	2.2 Use of broadband Internet and software	2.2.1 Organizations that use broadband access to the Internet, %
		2.2.2 Organizations that use special software, %
	2.3 Availability of the website and digitalzation of jobs	2.3.1 Organizations that have their own website, %
		2.3.2 Number of personal computers with access to the Internet per 100 employees, units
3. Digitalization of the state	3.1 Digital government services	3.1.1 People who use mobile devices to receive state and municipal services, % of the total population aged 15–72 who receive state and municipal services
		3.1.2 People who receive information through official websites and portals of state and municipal services, %
		3.1.3 People who interact with public authorities and local self-government via the Internet, by type of interaction "Implementation of mandatory payments (payment of duties, taxes, fines) online", % of the total population aged 15–72
	3.2 Quality of services	3.2.1 People's assessment of their level of satisfaction with the quality of public and municipal services provided via the Internet, fully satisfied, %
Indicators of the Index of digitalization conditions in the region (Idc)		
Digitalization condition	Factor	Indicator
1. Digital infrastructure	1.1 Internet	1.1.1 People who use the Internet, % of the total population aged 15–72
	1.2 Landline	1.2.1 Digitalization of the local landline telephone network, %
	1.3 Digital transmission systems	1.3.1 Length of long-distance, intra-zone and international landline telephone channels formed by digital transmission systems per area of the region, channel-kilometer/ha
2. Digital competences of the population	2.1 Internet skills	2.1.1 People who use the Internet every day or almost every day, % of the total population aged 15–72
	2.2 Computer skills	2.2.1 People who use personal computers, % of the total population aged 15–72
3. Digital education	3.1 Education level	3.1.1 Share of employed population with higher education in the total number of employed population, %
	3.2 Digitalization of education	3.2.1 Number of personal computers used for educational purposes in state and municipal organizations engaged in educational activities under educational programs of higher education, units per 1,000 people
4. Spatial and territorial structure	4.1 Urbanization of the territory	4.1.1 Proportion of urban population in total population, %
	4.2 Development of the territory	4.2.1 Population density, persons/km2
5. Development of science and innovation	5.1 Scientific research	5.1.1 Inventive activity coefficient, %
		5.1.2 Number of personnel engaged in research and development, people/10 thousand people
	5.2 Innovation activity	5.2.1 Share of innovative goods, works, services in the total volume of goods shipped, works performed, services provided by industrial production and the sphere of services, %
6. Endowment with resources	6.1 Energy resources	6.1.1 Power generation per capita, kWh/person
	6.2 Financial resources	6.2.1 Proportion of ICT expenditure in GRP, %
Sources: own compilation based on: 1. *Regions of Russia. Socio-Economic Indicators. 2016: Statistics Collection*. Rosstat. Moscow, 2016; 2. Laikam K.E., Abdrakhmanova G.I., Gokhberg L.M., Dudorova O.Yu. et al. *Information Society in the Russian Federation: Statistics Collection*. Rosstat, Nats. issled. un-t "Vysshaya shkola ekonomiki". Moscow: NIU VShE, 2017. 328 p.		

When assessing digital ecosystems of constituent entities of the Russian Federation we use matrix analysis with the method of k-max, which is a procedure for reducing a specific number of observations to several groups with similar characteristics. Since the selected indicators for the assessment of digital ecosystems are stimulator indicators (the higher their value, the better), then k is the maximum value of the variable x (indicator). The main advantage of the method consists in the use of mathematical apparatus in the calculations; this eliminates the subjectivity of the assessment.

Matrix analysis of the state of digital ecosystems was carried out according to the following algorithm.

Stage 1 – calculating the index of activity of digitalization subjects of the region *(Q_{mij})*.

To assess the level of activity of digitalization subjects of Russia's regions, we selected statistical data on the indicators of the region's digitalization index *(m_1, m_2, m_3,..., m_i)* for 2015 and 2016 presented in Table 2. The formula (1) was used to calculate the index of activity of digitalization subjects of each region):

$$Q_{m_{ij}} = \frac{x_j}{k_{max}}, \quad (1)$$

where x_j is the value of the index of digitalization of the *j*-th subject of the Russian Federation;

k_{max} is the maximum value of the digitalization index in the aggregate of all the subjects of the Russian Federation under consideration.

Stage 2 – calculating the index of activity of digitalization subjects of the region (I_{d_j}) by the formula (2):

$$I_{d_j} = \frac{(Qmij_1 + Qmij_2 + \cdots + Qmij_{17})}{17}. \quad (2)$$

Stage 3 – calculating the index of digitalization conditions of the region *($P_{n_{ij}}$)*.

To assess the conditions of digitalization of the Russian regions, we selected statistical data on the indicators of the region's digitalization conditions index *(n_1, n_2, n_3,..., n_i)* for 2015 and 2016 presented in Table 2. The formula (3) was used to calculate the index of digitalization conditions for each region):

$$P_{n_{ij}} = \frac{y_j}{k_{max}}, \quad (3)$$

where y_j is the value of the terms of digitalization of the *j*-th subject of the Russian Federation;

k_{max} is the maximum value of the indicator of digitalization conditions in the aggregate of all the subjects of the Russian Federation under consideration.

Stage 4 – calculating the index of digitalization conditions in the region *(I_{dc_j})* according to the formula (4):

$$I_{dc_j} = t_1 * \frac{P_{nij_1} + \cdots + P_{nij_3}}{3} + t_2 * \frac{P_{nij_4} + P_{nij_5}}{2} + t_3 * \frac{P_{nij_6} + P_{nij_7}}{2} + t_4 * \frac{P_{nij_8} + P_{nij_9}}{2} + t_5 * \frac{P_{nij_{10}} + \cdots + P_{nij_{12}}}{3} + t_6 * \frac{P_{nij_{13}} + P_{nij_{14}}}{2}, \quad (4)$$

where $t_1 - t_6$ are the weighting factors of the digitalization conditions.

The weighting factors for calculating the index of digitalization conditions in the region were obtained through a survey of experts using the analytic hierarchy process – the Saaty method *(Tab. 3)*.

The experts were representatives of public authorities, business community, scientific and educational organizations. In total, we interviewed 24 experts from eight regions of Russia: Arkhangelsk Oblast, Krasnoyarsk Krai, Vologda Oblast, Sverdlovsk Oblast, Republic of Karelia, Republic of Tatarstan, Republic of Komi, Republic of Sakha (Yakutia).

Table 3. Weighting factors for the groups of digitalization conditions

Group of digitalization conditions	Value
Digital infrastructure (t_1)	0.25
Digital competence of the population (t_2)	0.10
Digital education (t_3)	0.15
Spatial and territorial structure (t_4)	0.20
Development of science and innovation (t_5)	0.10
Resource availability (t_6)	0.20
Source: own elaboration according to a survey we conducted	

In our opinion, the introduction of weighting factors for the calculation of the index of activity of digitalization subjects of the region (Id) is not possible due to the equivalence of digitalization directions; and the high level of development of one direction does not guarantee the development of the others and the achievement of an effectively functioning digital ecosystem.

In order to present the results of the study more clearly, we propose to use the matrix method. To identify different types of ecosystems, the number of possible options must be specified in advance. The criterion of the optimal number of types is the possibility of their clear interpretation. We identify six types of regions (problem, passive, actively engaged, balanced, advanced and leading) that form the matrix of the digital ecosystem *(Fig. 1)*. The matrix allows us to group constituent entities of the Russian Federation according to the level and conditions of digitalization; this further simplifies the elaboration of recommendations to public authorities for the development of regional digital ecosystems.

In order to determine the boundaries of the types of digital ecosystems, we propose to use the formulas and the coordinate system presented in *Figure 2*.

Thus, the method we propose helps conduct a comprehensive assessment of both the level of activity of the subjects of digitalization of the region and the conditions for the development of digitalization formed in this territory. At the same time, on the basis of the estimates we have obtained it is possible to determine the main types of regional digital ecosystems and to identify their specific features in both positive and negative aspects.

Research results

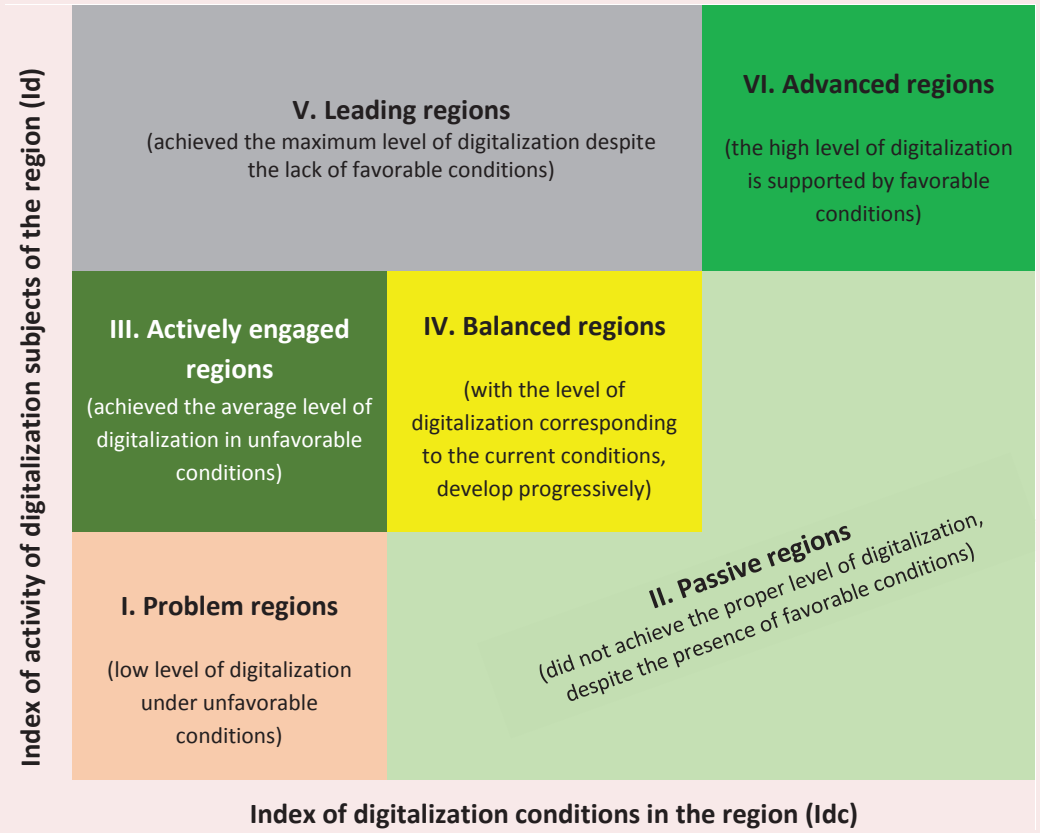
The objects of the study were 82 regions of Russia. Moscow, Saint Petersburg and Sevastopol were excluded from the total, as the values for most indicators of these cities differ significantly from the regional average. This is due to their special political and socio-economic situation, which may lead to misrepresentation of the evaluation results and to incorrect comparisons.

Having tested our method, we estimate digital ecosystems in regions of the Russian Federation in 2015–2016.

According to the results of the assessment in 2016 no region was included in the group of advanced regions. However, we should note that in 2015 this group was represented by Khanty-Mansi Autonomous Okrug, a region which implemented the existing potential for digitalization of the region to the fullest extent.

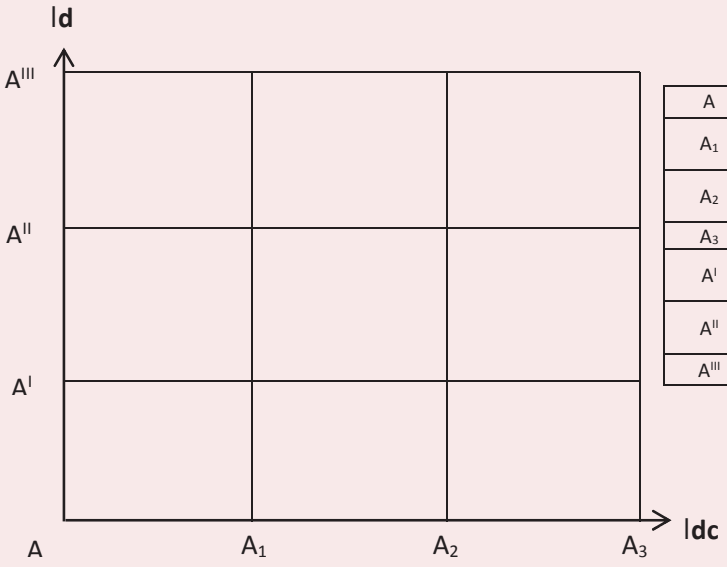
The group of advanced regions in 2016 included ten regions. Khanty-Mansi Autonomous Okrug was included in this group primarily due to the high index within the direction of "Digital activity of the population", the Yaroslavl Oblast – "Digital activity of organizations", and the Rostov Oblast – "Digitalization of the state".

Figure 1. Matrix of the types of digital ecosystems



Source: own compilation.

Figure 2. The form, according to which the boundaries of types of digital ecosystems are determined



A	minId – 0.1; minIdc – 0.1
A_1	$(\text{minIdc} - 0.1) + \frac{(\text{maxIdc} + 0.1) - (\text{minIdc} - 0.1)}{3}$
A_2	$(\text{minIdc} - 0.1) + 2 * \frac{(\text{maxIdc} + 0.1) - (\text{minIdc} - 0.1)}{3}$
A_3	maxIdc +0.1
A^I	$(\text{minId} - 0.1) + \frac{(\text{maxId} + 0.1) - (\text{minId} - 0.1)}{3}$
A^{II}	$(\text{minId} - 0.1) + 2 * \frac{(\text{maxId} + 0.1) - (\text{minId} - 0.1)}{3}$
A^{III}	maxId +0.1

Source: own compilation.

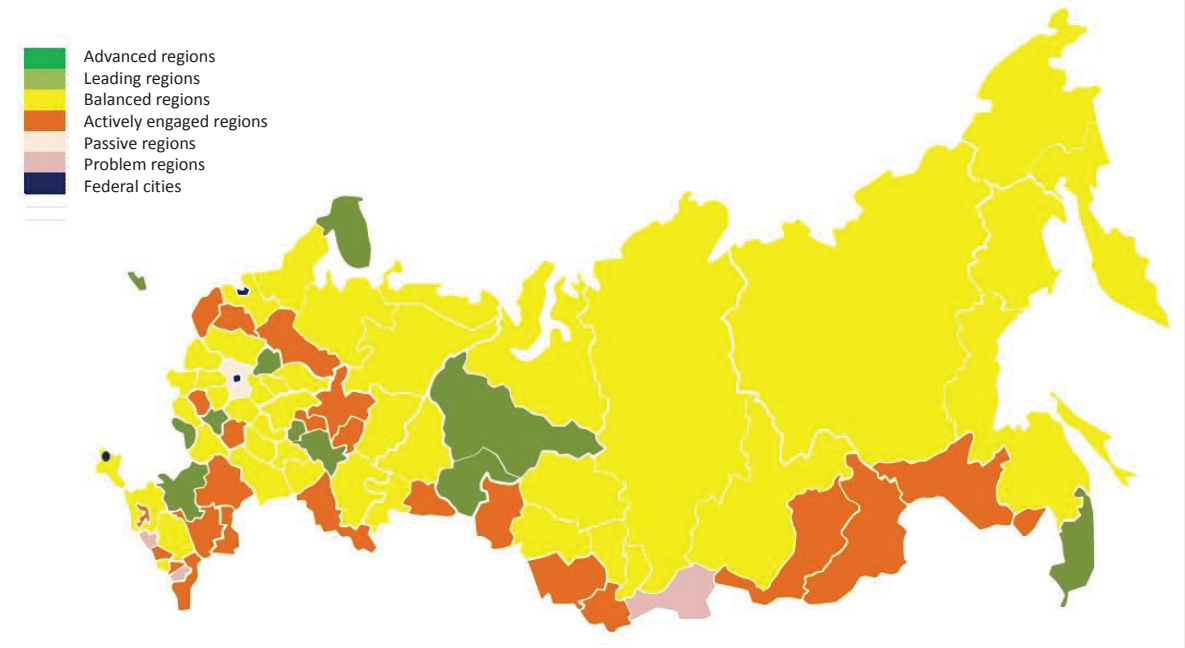
Figure 3. Matrices for assessing digital ecosystems of Russia for 2015–2016

1.Belgorod Obl.
2.Bryansk Obl.
3.Vladimir Obl.
4.Voronezh Obl.
5.Ivanovo Obl.
6.Kaluga Obl.
7.Kostroma Obl.
8.Kursk Obl.
9.Lipetsk Obl.
10.Moscow Obl.
11.Oryol Obl.
12.Ryazan Obl.
13.Smolensk Obl.
14.Tambov Obl.
15.Tver Obl.
16.Tula Obl.
17.Yaroslavl Obl.
18.Rep.of Karelia
19.Rep.of Komi
20.Nenets AO
21.Arkhangelsk Obl.
22.Vologda Obl.
23.Kaliningrad Obl.
24.Leningrad Obl.
25.Murmansk Obl.
26.Novgorod Obl.
27.Pskov Obl.
28.Rep.of Adygea
29.Rep.of Kalmykia
30.Rep.of Crimea
31.Krasnodar Obl.
32.Astrakhan Obl.
33.Volgograd Obl.
34.Rostov Obl.
35.Rep.of Dagestan
36. Rep.of Ingushetia
37. Kabardino-Balkar Rep.
38.Karachay-Cherkess Rep.
39.Rep.of North Ossetia – Alania
40. Chechen Rep.
41.Stavropol Krai
42.Rep.of Bashkortostan
43.Mari El Rep.
44.Rep.of Mordovia
45.Rep.of Tatarstan
46.Udmurt Rep.
47.Chuvash Rep.
48.Perm Krai
49.Kirov Obl.
50.Nizhny Novgorod Obl.
51.Orenburg Obl
52.Penza Obl.
53.Samara Obl.
54.Saratov Obl.
55.Ulyanovsk Obl.
56.Kurgan Obl.
57.Sverdlovsk Obl.
58.Khanty-Mansi AO
59.Yamalo-Nenets AO
60.Tyumen Obl.
61.Chelyabinsk Obl.
62.Altai Rep.
63.Rep.of Buryatia
64.Rep.of Tuva
65.Rep.of Khakassia
66.Altai Krai
67.Zabaykalsky Krai
68.Krasnoyarsk Krai
69.Irkutsk Obl.
70.Kemerovo Obl.
71.Novosibirsk Obl.
72.Omsk Obl.
73.Tomsk Obl.
74.Rep.of Sakha (Yakutia)
75.Kamchatka Krai
76.Primorsky Krai
77.Khabarovsk Krai
78.Amur Obl.
79.Magadan Obl.
80.Sakhalin Obl.
81.Jewish AO
82.Chukotka AO

Note. Federal cities are excluded from the total number of regions.

Source: own compilation on the basis of own calculations.

Figure 4. Map of digital ecosystems of Russia, 2016



Source: based on the data from Fig. 3, 2016.

The remaining regions of the leading group (Kaliningrad Oblast, Murmansk Oblast, Republic of Tatarstan, Lipetsk Oblast, Tyumen Oblast, Chuvash Republic and Primorsky Krai) demonstrated high indices in at least two areas of digitalization. This confirms the need for comprehensive development of digitalization in all areas. These regions, even if they do not enjoy the most favorable conditions, have reached a high level of digitalization, which deserves high scores.

The reverse situation is typical for the Moscow Oblast, which, despite the presence of the best conditions and favorable economic and geographical location, is the only one in the group of passive regions, primarily due to the low digital activity of the population.

The group of regions that are being actively involved in the process of digitalization included 24 regions. At the same time, 16 of them (Belgorod Oblast, Tambov Oblast, Pskov Oblast, Kabardino-Balkar Republic, Volgograd Oblast, Novgorod Oblast, Altai Krai, Astrakhan Oblast, Altai Republic, Orel Oblast, Udmurt Republic, Republic of Ingushetia, Kirov Oblast, Orenburg Oblast, Vologda Oblast and Omsk Oblast), under similar conditions with other regions of this group (Republic of Dagestan, Jewish Autonomous Oblast, Republic of Buryatia, Zabaikalsky Krai, Kurgan Oblast, Republic of Mari El, Republic of Kalmykia), have a high index of digitalization. In general, the regions of this group also deserve positive assessments, because, without favorable conditions, they were able to achieve an average level of digitalization. However, such regions as the Orel Oblast, Volgograd Oblast, Republic of Dagestan, Kabardino-Balkar Republic and the Kurgan Oblast, entered this group only due to relatively high values according to the direction of "Digitalization of the state". These results are ambiguous, as they can be interpreted both

as an effective regional policy in this area, and as the use of administrative resources by regional authorities.

The most numerous is the group of balanced regions, which includes the vast majority of the regions of the Central Federal District, the Volga region, Siberia and the Far East. We find it especially necessary to point out that the balanced group includes quite a few subjects of the Russian Federation located in the Arctic Zone. This is largely due to the geographical proximity of these regions, which forms ecosystems at the supra-regional level and allows them to obtain additional effects.

Problem regions from the point of view of the state of digital ecosystems are represented by three subjects of the Russian Federation: Karachay-Cherkess Republic, Chechen Republic and the Republic of Tuva. These regions have a low level of digitalization in all areas (digital activity of the population, digitalization of organizations, digitalization of the state) under unfavorable conditions for its development.

The results of the study are shown in *Figure 3*.

Visualization of the obtained results can be represented on the digital map of ecosystems in the regions of Russia *(Fig. 4)*.

Our paper describes the primary approbation of the proposed method for two years. In the future, it will be improved both in the territorial context (in-depth assessment of the territories of different macroregions), and in the context of new statistics characterizing digitalization of the country.

Conclusion

Thus, in order to make an assessment of the level of development of digital ecosystems in the regions reliable and accurate enough, the algorithm should take into account not the individual characteristics of these systems, but their full content, including the subjects of digitalization of the economy and society, environmental conditions, territorial features, information technology, the development of science and innovation, and infrastructure. Therefore, our assessment methodology includes two integrated indices, which in turn aggregate 31 statistical indicators.

The technique we propose is more resistant to technological and technical changes in the digital economy and the ecosystem as a whole with respect to other methods considered. This means that, with the advent of new technologies and services, the outdated indicator is easily replaced, but the direction of digitalization and the conditions that ensure it remain unchanged.

Having tested the proposed method we were able to carry out a pilot analysis of the state of digital ecosystems in the regions of Russia and to determine their specific and typical features. In most regions, the level of development of digital ecosystems corresponds to the conditions of the information environment and the availability of the necessary infrastructure; such regions are balanced regions. Unfortunately, there is a number of regions which should be called problem regions, as in them the level of development of the digital economy, and the conditions for its formation are insufficient, much lower than the average values (Karachay-Cherkess Republic, Chechen Republic and the Republic of Tuva). As a positive example, we should note the regions that, with insufficient development of conditions for digitalization and without the most favorable conditions, have achieved the maximum level of digitalization (for example, Chuvash Republic, Tyumen Oblast, Murmansk Oblast).

Our method for assessing digital ecosystems allows us to reliably assess not only the level of their development, but also certain specific

features (advantages or problems), and its results can be used by the executive authorities in order to make management decisions and adjust their activities toward the development of regional digital ecosystems. As a pilot project, the results of the study were used during strategic sessions in the development of draft texts of the strategy for socio-economic development of the Arkhangelsk Oblast for the period up to 2035.

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Investment Processes and Structural Changes in the Economy of Old Industrial Regions of the Northwestern Federal District*

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Abstract. In the changing global geopolitical and geo-economic conditions, the issues related to sustainable growth of the national economy, promoting its pronounced development dynamics and providing it with high technology are among the most important directions for Russia's modern economic policy. The priority tasks of national development require an inflow of large-scale investments in the economy, but the question of their rational distribution remains open, so that the attention of investors is directed mainly toward resource-based activities. At the same time, knowledge-intensive industries, which should be at the forefront of new industrialization, are experiencing a clear lack of investment and are in a state of stagnation. In particular, the above is true for a group of Russia's old industrial regions, in which the described situation is even more serious and leads to de-industrialization against the background of insufficient amount of investment at hand. In this regard, the goal of the paper is to analyze investment processes and assess their impact on the changes in the structure of industrial production on the example of old industrial regions of the Northwestern Federal District. We have chosen this object for our study due to the fact that these subjects of Russia occupy one of the worst positions among all old industrial territories according to a number of economic and social parameters. Scientific novelty of our work consists in the need to reveal modern patterns of socio-economic processes and identify structural deformations in the

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economy. The findings of our study reflect the current state of investment processes and the nature of structural transformations in the old industrial regions of the Northwestern Federal District, taking place against the background of strengthening resource-based industries. Practical significance of the findings is determined by the fact that they contribute to a better understanding of the current socio-economic situation of the sample under consideration and are useful for further study of the specifics of these territories and the problems they face.

Key words: old industrial regions, economic structure, structural changes, industrial production, investment.

Introduction. The structural changes in the Russian economy that have taken place in recent decades as a result of market reforms and destabilization of the external environment have been naturally reflected in the development of old industrial regions. The dependence of these territorial entities on the external economic situation is currently increasing, the technical and technological level of production is shut down, there is a threat of reducing tax revenues to the budget system, reducing consumer demand [1]. Structural transformations have played a significant role in the deformation of material production of old industrial regions, especially high-tech industries, and have become one of the causes of investment drought in it.

Old industrial regions of the Northwestern Federal District[1] (hereinafter referred to as OIR NWFD), compared with other regions of this type, are territories of depressive development. This conclusion is based on the performance of indicators such as GRP (in recent years, the growth amounted to 104.4% against 112.6% in general for all old industrial regions), industrial production (111.3% against 115.3%) and capital investment (98.3% against 114.4%), people employed in the economy (the decline in OIR NWFD was 12% against 2.8% for the entire sample). According to these parameters, OIR NWFD occupy one of the worst positions among all old industrial regions.

Such features of regional development put forward an assumption, according to which the current state of OIR NWFP is determined by both insufficient incoming investment and its structural imbalance. In this regard, the purpose of the study is to analyze investment processes and assess their impact on changes in the structure of industrial production on the example of a separate group of Russian regions characterized by similar socio-economic problems.

Theoretical aspects of the research. A lot of research works are devoted to the study of old industrial regions; they raise a variety of issues of development of these territories. Such attention on the part of the scientific community is due to acute system problems, which in the future may be reflected in the slowdown in the growth of the entire Russian economy. In other words, old industrial regions can turn from development drivers into a "burden".

[1] This group includes republics of Karelia and Komi, the Arkhangelsk, Vologda, Murmansk and Novgorod oblasts. In Russia, it is possible to distinguish 24 territorial entities whose economic characteristics meet the criteria of an "old industrial region" [2].

The most fundamental criteria are: early start of industrial development of the territory, a significant share of industry in the structure of GRP (for 17 out of 24 old industrial regions, this figure exceeds 40%), a high share of low-level activities (mainly dominated by 3 mode technologies). The sectoral core of the economy of such regions is at the industrial or post-industrial stage of development [3; 4], and the structure of the industrial sector was completed by the middle of the 20th century and almost did not undergo significant changes further.

Therefore, the scientific attention is concentrated both on the regional economy as a whole, as well as sectoral economy and municipal economy. In the latter case, the emphasis shifts from the regions themselves to single-industry towns, the examples of which cover issues of revitalization, strategic management, organization, priority development areas, demographic sustainability, environmental safety, etc. [5–8].

At the regional level, the search for optimal solutions to ensure economic security and new industrialization, and eliminate acute problems of socio-economic development is particularly relevant [1; 9; 10]. In particular, the researchers note that the most characteristic bottlenecks for many old industrial regions are financial and personnel shortage, low productivity, innovative inertia, predominance of low-level industrial production, high depreciation, slow pace of technical and technological renewal, often – dependence on materials industries, etc. [11-14].

In this regard, research works pay much attention to the improvement of the regional industrial policy and investment optimization. A special role is belong to the issues of increasing the efficiency of interaction between the production sector, the authorities and educational institutions [11; 15]. The features of spatial distribution of productive forces are covered [16]. The state of old industrial regions taking into account institutional, economic, social, organizational, environmental and other factors is still not a downward trend [10–13]. This is largely due to heterogeneous territorial groups under study, as well as the regular need for disclosing modern patterns of socio-economic processes.

It can be stated that old industrial regions as a research object are now widely covered in the scientific literature. However, there is still insufficient attention to individual territorial groups or regions, which leaves particular problems of socio-economic development out of the focus of the scientific community. This, in turn, prevents the formation of a full image of the state of old industrial regions. We should also note that in light of the increasing development of approaches to analyzing the impact of structural changes on the economic development, the study of transformational changes in the national economy and factors causing them becomes particularly relevant.

Research methods. To achieve the specified goal we use methods of economic, statistical and comparative analysis, generalization. The methodological framework of the research includes the materials of territorial bodies of the Federal State Statistics Service for republics of Karelia and Komi, the Arkhangelsk, Vologda, Murmansk and Novgorod oblasts, data of the Unified Interdepartmental Information and Statistics System, as well as the works of leading economists in regional economy.

A kind of incentive for the research was the publication of B. Zamarayev and T. Marshova "Investment processes and structural restructuring of the Russian economy", which presents methodological approaches to assessing the structural characteristics of the Russian economy in the context of indicators such as investment, production capacity, GVA [17]. With some assumptions these materials are tested in OIR NWFD.

Due to no access to the initial detailed data for the calculation of the regional sectoral structure of production capacity and GVA in this study, the assessment of structural changes is carried out based on indicators "investment in fixed capital" and "volume of shipped own goods, works and services". We emphasize that the change in the set of indicators did not become critical and only led to a change in the

perspective of the stated problem: now the focus is on the analysis of the dependence of intensity of production activities in the industry of OIR NWFD on the volume of available investment.

Despite the adjustment, the approach to assessing structural transformations in the economy remains the same: indicators "structural shift vector" and "structural shift intensity" are used for the analysis. The first indicator shows the total change in the share of the element and is calculated according to the formula:

$$V_j = d_j^{t^n} - d_j^{t^0}, \quad (1)$$

where: V_j –structural shift vector of element j; d_j^t – share of j-th element of the structure under review in year t; $t_0 \ldots t_n$ – year of the period under review.

The second indicator – the rate of change in the share of the element in the total for a specified period – is calculated according to the formula [17]:

$$S_j = \left| \sqrt[n]{\frac{d_j^{t_n}}{d_j^{t_0}}} - 1 \right| * 100, \quad (2)$$

where: S_j – index of structural shift intensity of element j.

Structural changes in the economy of OIR NWFD are reviewed during 2005–2017. In order to eliminate annual fluctuations in calculations of shift vectors we use values averaged for three years.

Main research results. The most important role in the development of old industrial regions belongs to the industrial sector, whose average share in the sectoral structure of GVA at the end of 2017 amounted to 45.1%. A similar situation is observed in the group of OIR NWFD (*Tab. 1*): on average, this sector accounts for 43.1% of GVA, the highest volume being produced by processing industries (22%), slightly less – fuel and energy (16.7%). It can be noted that the Murmansk Oblast is somewhat out of place: there, industry forms only 28.2% of GVA, but this is not an indicator of deindustrialization, but rather a consequence of developed fishery, since the region is one of the largest Russian suppliers of fish products to domestic and foreign markets.

Analysis of the performance of industrial production in the past 13 years leads to a conclusion about the relatively stable rates of industrial development in all OIR NWFD (*Tab. 2*). It is obvious that in view of the high increase rate in production and a considerable volume of output, these regions, for the most part, have significant resource and teccho-

Table 1. Share of industry in the GVA structure in 2017, %

Region	B	C	D	E	Total
Komi Republic	37.2	11.7	2.8	0.5	52.2
Arkhangelsk Oblast	30.9	16.9	2.2	0.4	50.4
Novgorod Oblast	0.8	38.9	5.5	0.8	46.0
Vologda Oblast	0.0	38.1	3.1	0.9	42.1
Republic of Karelia	17.6	16.9	4.1	1.0	39.6
Murmansk Oblast	13.4	9.7	3.9	1.2	28.2
Average value	16.7	22.0	3.6	0.8	43.1

Legend:
B – mining; C – processing; D – provision of electricity, gas and steam; air conditioning; E – water supply; water disposal, waste collection and disposal, pollution control activities.
Source: compiled by the author according to the Federal State Statistics Service.

Table 2. Industrial production, bln RUB (in the prices of 2017)

Region	2005	2010	2015	2016	2017	2017/2005, %
Novgorod Oblast	119.1	134.2	189.9	197.1	206.0	173.0
Arkhangelsk Oblast	471.5	638.5	523.0	561.1	648.1	137.5
Vologda Oblast	487.8	528.4	616.5	615.2	621.4	127.4
Murmansk Oblast	278.7	261.7	284.5	303.3	336.3	120.7
Komi Republic	455.2	518.0	577.4	554.3	537.6	118.1
Republic of Karelia	190.5	186.6	185.3	192.1	196.7	103.3
Source: compiled by the author according to the Federal State Statistics Service.						

technological potential. However, the issue of its implementation has for a long time remained open, which is why many industries demonstrate inertia in development, renewal of funds, changes in nomenclature, its quality and technological parameters.

The structure of industrial production of the territories under review is dominated by output of intermediate products, whose share in 2017 amounted to 43.5%. In recent years, the positions of the fuel and energy sector have significantly strengthened, the share of consumer and investment products – slightly increased. This was mainly the result of the transformation processes in the regional economy caused by changes in the external and internal environment.

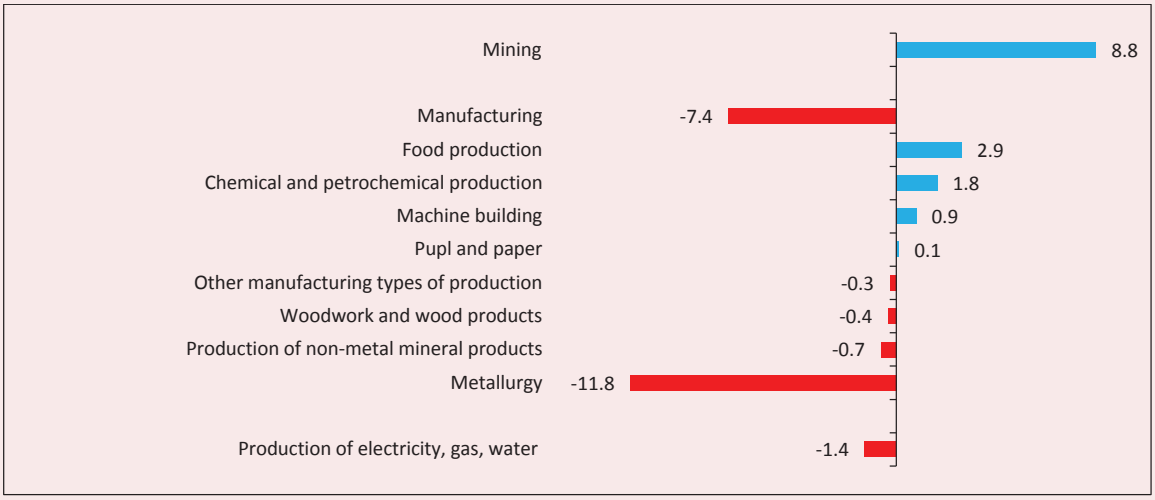
In particular, they were negatively manifested in a significantly decreased share of shipped products of metallurgy (there was a decline from 27.7 to 18.9 percentage points (p.p.)) and a number of other industries, but at the same time led to a significant development of food and machine-building industries – their share increased by 2.2 and 3.1 p.p. respectively (*Tab. 3*).

The analysis of transformations in the structure of industrial production of OIR NWFD shows that during 2005–2017 greatest positive changes occurred in mining (the shift value – 8.8 p.p., average annual intensity – 2.5%), in food (2.9 p.p. and 3.4%, respectively) and chemical (1.8 p.p. and 1.3%) industry. The decline in the relative size of metallurgical plants

Table 3. Structure of industrial production in OIR NWFD, %

Type of economic activity	2005	2010	2015	2016	2017
Fuel and energy products	22.2	31.1	31.8	33.1	30.6
Mining					
Intermediate products	54.7	47.0	45.2	44.1	43.5
Manufacture of wood and wood products	4.6	3.5	4.2	4.5	4.1
Chemical and petrochemical products	10.7	10.8	13.1	11.1	10.5
Metal products	27.7	20.8	18.4	17.8	18.9
Production of electricity, gas, water	11.7	11.9	9.6	10.7	10.0
Consumer products	13.9	15.1	16.4	17.2	14.3
Food products	5.4	7.8	8.5	8.7	7.6
Pulp and paper products	7.1	5.9	6.5	7.0	6.1
Other types of manufacturing	1.5	1.4	1.4	1.5	0.6
Investment products	9.1	6.8	6.6	5.6	11.6
Production of non-metal mineral products	2.1	1.6	1.3	1.4	1.4
Machine building	7.0	5.2	5.3	4.2	10.2
Source: compiled by the author according to the Federal State Statistics Service.					

Figure 1. Structural shift vector in shipment of industrial products in OIR NWFD in 2005–2017, p.p.



Source: calculated by the author according to the Federal State Statistics Service.

amounted to -11.8 p.p., the average compression rate – 3.7 %. The decrease in the share of this type of activity led to a negative shift vector in manufacturing in general (-7.4 p.p.) with an average annual intensity of 0.9% (*Fig. 1*).

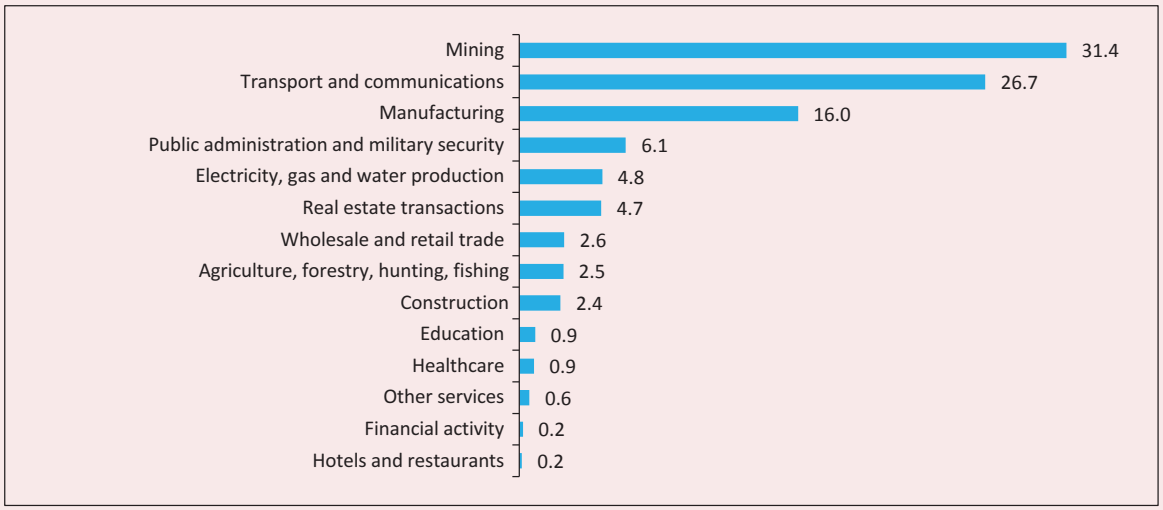
At present, the necessary conditions for ensuring sustainable economic growth are the stimulation of investment and innovation activities, the implementation of effective industrial policy, and the improvement of the business climate [18–20]. A wide range of measures are implemented in the Northwestern Federal District for this purpose, but the level of investment attractiveness of these territories still does not accumulate a large amount of investment. Thus, during 2005–2017, investment in fixed assets increased only by 32.8%, the average annual growth rate – 2.4%.

A steady inflow of investment mostly reflects fuel and energy in OIR NWFD, transport companies and processing industries, which is a sign of lack of proper investment in other economic sectors, available funds and high risk (*Fig. 2*).

The greatest positive structural changes in investment in the economy of OIR NWFD during 2005–2017 were recorded by type of activity in "mining" and "public administration and military security". In the first case, the structural shift value was 7.4 p.p. with an average annual rate of 2.0%, in the second – 4.6 p.p. with the intensity of 11.4% (*Fig. 3*). Against this background, processing industries look extremely faded (0.5 p.p. and 0.2%, respectively), investment in which has not significantly changed over the years, which once again emphasizes the inertia of the development of this activity.

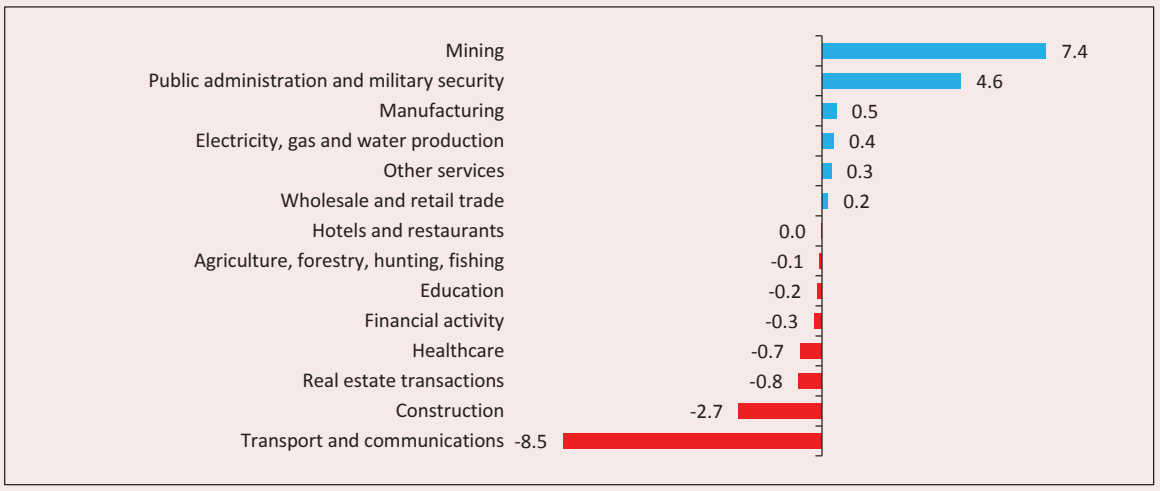
Significant negative transformations in the investment structure occurred in transport (shift – 8.5 p.p. with an average annual rate of 2.0%) and construction (-2.7 p.p. and 8.1%, respectively). Attention is drawn to the reduction of investment in socio-cultural activities, in particular, education and health: the shift value was -0.2 and -0.7 p.p., average annual intensity – 1.3 and 4.6%, respectively.

Figure 2. Structure of investment in the economy of OIR NWFD in 2017, %



Source: calculated by the author according to the Federal State Statistics Service.

Figure 3. Structural shift vector of investment in the economy of OIR NWDFD in 2005–2017, p.p.



Source: compiled by the author according to the Federal State Statistics Service.

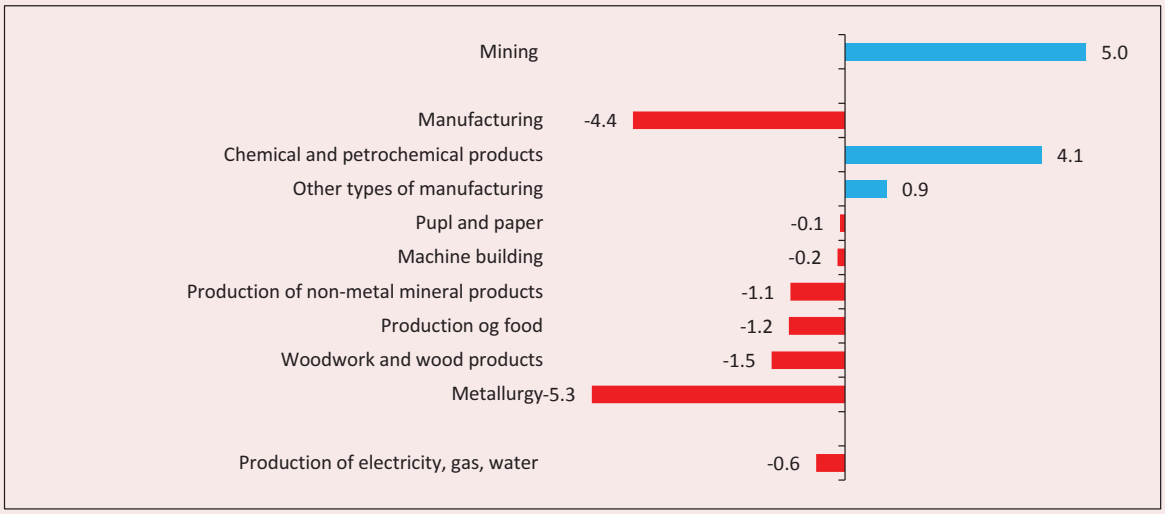
As for industries themselves, it can be noted that fuel and energy occupies the largest share in the structure of investment (60.2% in 2017). The types of activities that produce intermediate products account for slightly less than one third of all investment: basically, they are accumulated by production of electricity, gas and water (9.2%), metallurgy (8.4%) and chemical products (7.3%).

Apparently, production of investment products in OIR NWFD does not cause any significant investment interest, which demonstrates, firstly, its lowest share in the analyzed structure, and second, its gradual decline in recent years (*Tab. 4*). Without touching upon the issue of competitiveness of machine-building enterprises located in the regions under review, we can assume that one of the reasons

Table 4. Structure of investment in industry in OIR NWFD, %

Type of economic activity	2005	2010	2015	2016	2017
Fuel and energy products	48.8	55.0	67.3	60.4	60.2
Mining					
Intermediate products	36.9	30.9	26.0	30.0	28.3
Production of electricity, gas, water	7.2	16.3	7.2	7.1	9.2
Metal products	19.7	6.6	5.1	6.9	8.4
Chemical and petrochemical products	4.9	5.2	11.0	11.6	7.3
Manufacture of wood and wood products	5.1	2.8	2.7	4.3	3.5
Consumer products	10.4	12.0	6.0	8.4	9.9
Pulp and paper products	6.0	8.5	2.4	4.0	6.8
Other types of manufacturing	2.1	1.9	2.9	3.5	2.3
Food products	2.3	1.6	0.7	0.9	0.8
Investment products	4.0	2.1	0.8	1.2	1.7
Machine building	1.1	0.7	0.5	0.8	0.9
Production of non-metal mineral products	2.9	1.4	0.3	0.3	0.7

Figure 4. Structural shift vector of investment in industry of OIR NWSD in 2005–2017, p.p.



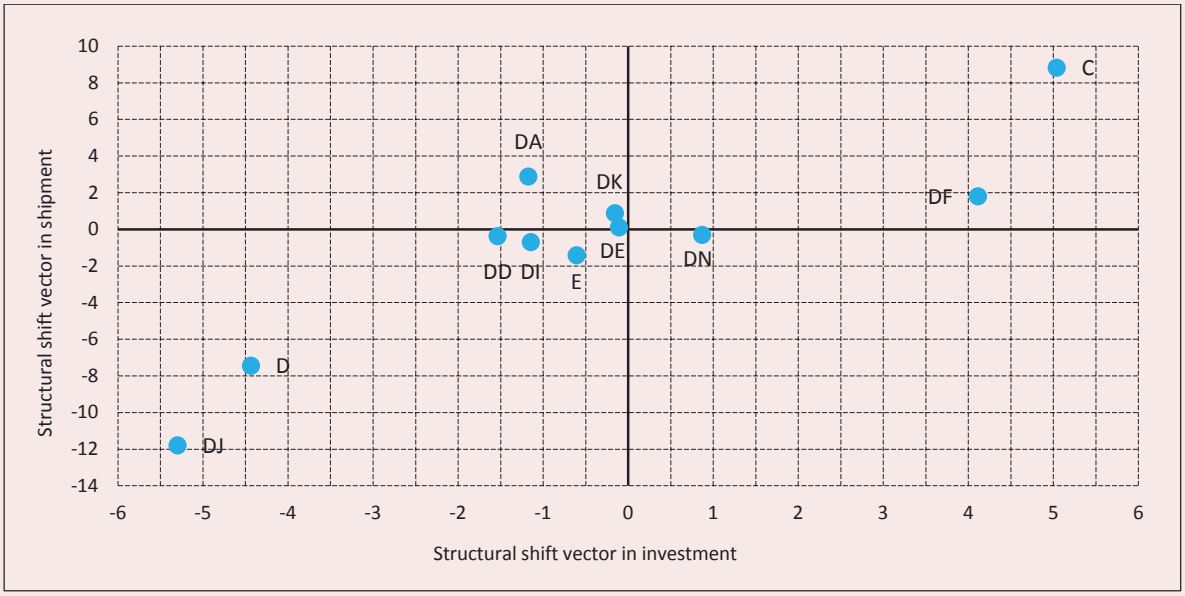
Source: calculated by the author according to the Federal State Statistics Service.

for such a situation is the unstable economic situation in the country, which is quite fully described by the following quote: "When within one year ruble fluctuates to dollar within 25%, and real interest rates on loans remain at least 7–8%, it is too risky to invest" [21].

The leaders in the strength and speed of positive structural shifts in industrial investment are mining (shift value – 5.0 p.p., average annual intensity – 0.6%) and chemical and petrochemical production (4.1 p.p. and 4.2%, respectively).

The strongest negative structural shift occurred in metallurgy – the change during 2005–2017 was -5.3 p.p. with an average annual intensity of 4.3%. The shift value in woodworking, food and other non-metal industries is almost in the same range [-1,5; -1,1], but the transformation rate varies from 2.8 to 9.1% (*Fig. 4*).

Figure 5. Intensity of structural changes in industry of OIR NWFD in 2005–2017, p.p.



Legend:

C – mining; D – manufacturing; DA – manufacture of food products, beverages and tobacco; DD – manufacture of wood and wood products; DE – pulp and paper; publishing and printing; DF – manufacture of coke, refined petroleum products and nuclear materials, including chemicals, manufacture of rubber and plastic products; DI – manufacture of other non-metal mineral products; DJ – metallurgic and finished metal products; DK – manufacture of machinery and equipment, including electrical, electronic and optical equipment, manufacture of vehicles and equipment; DN – other products, including textile and garment, leather, leather goods and footwear; E – production and distribution of electricity, gas and water.

Source: calculated by the author according to the Federal State Statistics Service.

Investment processes in the economy determine the prospects for changing its sectoral structure, which will later significantly affect the features of the sectoral distribution of capital investment [17]. The transformations observed in the economy of OIR NWFD which mostly demonstrate direct dependence of industrial production on the volume of investment, help distinguish 4 groups of industries with fundamentally different ratio of structural shifts in shipping and investment (*Fig. 5*).

1. An increase in the share of the industry in the structure of capital investment and in the structure of shipped goods. The group includes mining, chemical and petrochemical industry. In the first case, a significant increase in the share of investment (5.0 p.p.) activated an even greater increase in the share in the volume of shipment (8.8 p.p.). In chemical industry, on the contrary, the investment increase (4.1 p.p.) led to a three times smaller shift in the structure of shipped goods (1.8 p.p.).

2. An increase in the share of the industry in the structure of capital investment with a decrease in the structure of shipped goods. This group consists only of other manufacturing industries, which due to the specific features of the analyzed statistics in this study were supplemented with light industry branches. Thus, with a small increase in the share of investment (0.9 p.p.), the segment has slightly lost its share in the shipment structure (-0.3 p.p.). Of course, it would be a mistake to state

the existence of such a contradictory correlation – the result could be due to a statistical error as well as a variety of organizational and economic factors.

3. A decrease in the share of the industry in the structure of capital investment with an increase in the structure of shipped goods. The sectors of this group demonstrate slight downward shifts in the structure of investment, observed against the background of an increase in the share in the volume of shipped goods. Thus, the change in the share of food production in investment amounted to -1.2 p.p. while the increase in the shipment reached 2.9 p.p. The shift of machine building on the horizontal axis by -0.2 p.p. did not prevent the demonstration of progress on the vertical axis by 0.9 p.p. Finally, the structural shift of pulp and paper along both axes is almost in the zero zone – the change was [-0.1; 0.1].

4. A reduction in the share of the industry in the structure of capital investment and in the structure of shipped goods. The group consists of activities whose effectiveness directly depends on investment proposal. In particular, the decrease in the share of metallurgical production in the volume of industrial investment (-5.3 p.p.) led to a significant drop in the share of the industry in the structure of shipped goods (-11.8 p.p.). Transformation processes similar in strength and direction affected woodwork and production of other non-metal mineral products: the share of industries in the structure of investment decreased by -1.5 and -1.1 p.p. respectively, in the volume of shipment – by -0.4 and -0.7 p.p. Note that in general, the movement of processing industries along the horizontal axis (-4.4 p.p.) initiates almost two-fold movement of this type of activity along the vertical axis (-7.4 p.p.). The situation is repeated in the case of production and distribution of electricity, gas and water: an insignificant decline in investment (-0.6 p.p.) contributed to a decrease in the share of production by -1.4 p.p.

Conclusion. The development of old industrial regions in the Northwestern Federal District in 2005–2017 was accompanied by significant structural transformations, which led to significant changes in the social and economic spheres of the society. They were manifested in the decline in investment activity of enterprises, accompanied by the degradation of certain manufacturing sectors, and the decline in the share of this activity in the structure of shipped goods.

These changes occurred against the strengthening of material profile of OIR NWFD – in all regions under review the share of mining increased in the structure of industrial production. The observed shift is in the range from 3.6 p.p. in the Republic of Karelia[2] to 11.1 p.p. in the Komi Republic.

The example of economy of old industrial regions of the Northwestern Federal District shows that efficient investment policy in fuel and energy contributes to a steady increase in the volume of materials production, but at the same time significantly distracts investors from manufacturing and leads to a decrease in the volume of shipped goods. Such deformations have a negative impact on the prospects of modernization of the national economy; they cause an increase in its dependence on imports; prevent the implementation of the national policy on economic digitalization and the increase in the share of high-tech industries.

[2] Only old industrial regions of the Northwestern Federal District with more or less developed type of activity "mining" were taken into account. These include the Republic of Karelia, where its share in the structure of shipped goods in 2017 amounted to 37.5%, the Komi Republic – 58.5%, the Arkhangelsk and Murmansk oblasts – 45.5% and 32.1%, respectively. Compare: in the Vologda Oblast, fuel and energy accounts for 0.1%, in Novgorod – 0.8%.

One of the ways to prevent such unfavorable prospects can be the implementation of a strictly targeted structural policy to redirect investment resources from excessive sectors to outsiders. Meeting investment needs in manufacturing will be a high-capacity factor in new industrialization in old industrial regions of the Northwestern Federal District and will ensure the formation of their modern high-tech image corresponding to the current requirements of the era of universal digitalization.

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Territorial Planning and Zipf's Law

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Abstract. Territorial planning is an integral part of strategic planning in accordance with the current legislation of the Russian Federation. When development strategies are elaborated, the assessment of the socio-economic situation in the region should be based on the results obtained in the course of studying the current situation in a constituent entity of the Russian Federation in comparison with its border territorial entities, as well as in comparison with indicators in the macroregion (federal district). SWOT analysis is the most common technology for assessing the situation in a region. Due to various reasons the use of this method does not provide high accuracy of the result. The use of the Zipf distribution (inversely proportional dependence) as a reference provides an opportunity for a more accurate quantitative analysis of the dynamics of indicators used to assess the socio-economic situation in territorial entities. The goal of the paper is to determine current external conditions, trends and imbalances in the socio-economic situation in a region with the use of Zipf's law. In contrast to the traditional use of the law in the study of demographic indicators, our paper aims to consider the dynamics of changes in gross regional product and in the number of jobs. The results indicate that the distribution of the value added and the distribution of number of jobs tend to an inversely proportional function. The discussion of the results is presented in the form of a discussion on the impact of socio-economic situation on the formation of long-term development plans; the discussion takes into account the positions of constituent entities of the Russian Federation on the Zipf curve. In addition, we substantiate the possibility and necessity of using the gross regional product indicator in the conditions of the Russian Federation. Our conclusions show the

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advantage of using distributions to study the existing external environment in a constituent entity of the Russian Federation. Practical application of Zipf's law helps define the starting conditions and forecast the consequences of implementation of socio-economic development strategies more accurately and to substantiate quantitative indicators for long-term plans.

Key words: Zipf's law, gross regional product, gross value added, number of jobs, population, strategic planning, territorial planning.

Introduction

With the adoption of the RF Law "On strategic planning in the Russian Federation", the forecast (Articles 33 and 34, Law 172-FZ), as well as the scheme of territorial planning (Article 38, Law 172-FZ) are elaborated in the strategic planning documents in addition to the strategy for socio-economic development of the constituent entity of the Russian Federation (Article 32, Law 172-FZ). In accordance with Law 172-FZ, the scheme of territorial planning should reflect the main provisions of the strategy for socio-economic development of the constituent entity of the Russian Federation, the macroregion and the country as a whole. It should be noted that the sequence of development of strategic planning documents does not strictly regulate the order in which the documents should be developed. In this regard, there may be situations in which the development of territorial planning schemes may be ahead of the formation of the socio-economic development strategy.

It is important to emphasize that the development of documents for long-term planning of socio-economic development of territorial entities should meet the objectives (Article 8, Law 172-FZ) and should not contradict the principles (Article 7, Law 172-FZ). Therefore, the strategy and the scheme of territorial planning should be based on the findings of the study of the existing "internal and external conditions, trends, constraints, imbalances and opportunities"[1] and "provide an opportunity to assess the achievement of socio-economic development goals using quantitative and (or) qualitative targets, criteria and methods for their evaluation used in the strategic planning process"[2]. Based on these requirements, in order to quantify imbalances and disproportions it is expedient to use the features that describe the employment of economically active population and the efficiency of jobs functioning in the economy of the territorial entity.

It is not difficult to predict the goal of socio-economic development of the constituent entity of the Russian Federation, which is formulated, in most cases, as improving the quality of life taking into account the interests of economic agents [1]. It is necessary to pay attention to the expected degree of participation of the federal government in the implementation of regional strategies, the priority of which "should not consist in addressing the issues of equalizing the socio-economic indicators of the regions, but in implementing specific infrastructure projects aimed at improving the transport and economic connectivity of territories, interregional integration and territorial mobility of the population, as well as increasing the availability of social infrastructure services" [2].

[1] Paragraph 2, Article 8 of Federal Law No. 172-FZ "On strategic planning in the Russian Federation" of June 28, 2014 (as amended on December 31, 2017).

[2] Paragraph 11, Article 7 of Federal Law No. 172-FZ "On strategic planning in the Russian Federation" of June 28, 2014 (as amended on December 31, 2017).

In order to measure the extent to which the goal of long-term socio-economic development has been achieved it is necessary to determine quantitative indicators. Most often, they include gross domestic product, the number of jobs, and population size; these indicators are widely used in forecasting [3] and strategic planning [4]. Indeed, the dependence of the number of residents on the number of jobs in the settlement or constituent entity does not require proof. It is clear that value added is created in the workplace and therefore depends on the number of jobs and the industry they operate in. In addition, the amount of value added is significantly affected by the efficiency of jobs.

Territorial planning regulated by Chapter 3 of the Town Planning Code of the Russian Federation[3] requires that objects of federal and regional significance along with the transport and social infrastructure be depicted on the maps of the territory of RF constituent entities. The capacity of the objects of regional transport and social infrastructure that are planned to be constructed in the long term is calculated according to the rules established by the Regulations[4] 42.13330.2011. If we consider its provisions, we will find it easy to formulate a conclusion about the dependence of the capacity of transport and social infrastructure facilities on the number of inhabitants in the settlements. According to the logic of our work, the number of inhabitants depends on the number of jobs, and the change in the number of jobs is not difficult to estimate by the amount of value added produced by the economy of the settlement.

[3] Town Planning Code of the Russian Federation: approved by Federal Law 190-FZ of December 29, 2004 (as amended on December 25, 2018).

[4] Regulations 42.13330.2011. Regulations. Town Planning. Planning and Development of Urban and Rural Settlements. An Updated Version of Construction Rules and Regulations 2.07.01-89: Approved by Order No. 820 of the Ministry of Regional Development of Russia dated December 28, 2010.

The development of strategic planning documents (socio-economic development strategy and territorial development scheme) is preceded by the study of "internal and external conditions, trends, constraints, imbalances, disproportions and opportunities". In this regard, we consider it important to study the changes in the quantitative indicators of gross regional product, number of jobs and population size. The relevance of the research topic under consideration is confirmed by the norms of the current legislation of the Russian Federation (Paragraph 11, Article 7; Paragraph 2, Article 8, Law 172-FZ) that determine the study of the initial socio-economic situation in constituent entities of the Russian Federation for the goals of long-term socio-economic planning and forecasting. It is necessary to point out once again that the territorial planning scheme is an integral part of strategic planning documents. The location of socio-economic and transport infrastructure of regional and federal importance depends on the forecasted settlement system.

The *goal* of our research is to determine the current external conditions, trends, imbalances and disproportions in the socio-economic situation of the Volgograd Oblast.

To achieve the goal we address the following tasks:

1. We study the dynamics of changes in gross regional product, the number of jobs and population size in the same units of measurement.

2. We test Zipf's law for the quantitative indicators of a macro-region that assess the external environment of the Volgograd Oblast.

Research methods

Different measurement units are used to measure gross regional product, the number of jobs and population size. Bringing the indicators to a common scale of measurement

is possible with the use of relative indicators. From our point of view, the most interesting is the relative indicator characterizing the importance of a constituent entity of Russia for the country as a whole. In this regard, statistical values describing the total value for the Russian Federation were used as a basis for obtaining relative indicators. Thus, the study brought together the results for each quantitative indicator under consideration. The relative index was calculated according to the formula:

$$d_{Si} = \frac{D_{Si}}{\sum_{i=1}^{i=n} D_{Si}},$$

where d_{Si} is the share of value added produced by the i-th constituent entity of the Russian Federation in the corresponding year;

D_{Si} – value added (GRP), produced by the i-th constituent entity of the Russian Federation in the corresponding year, in monetary units (rubles);

$\sum_{i=1}^{i=n} D_{Si}$ – the amount of added value (GRP) produced by all *"n"* constituent entities of the Russian Federation (GDP), expressed in monetary units (rubles).

Zipf's law (rank – size) in research methods did not appear accidentally. The law is widely used not only in linguistics and economic geography, but also in assessing the socio-economic situation of a territory [5], the attractiveness of settlements [6], spatial and economic research [7] and traditionally – to assess income inequality [8]. At the same time, some researchers fully confirm the effect of Zipf's law [9], while others establish restrictions on its action [10]. If we lay aside the discussions with mathematicians concerning the rank – size function (inversely proportional function), and consider only the results of the study provided further, then there is no obstacle to comparing the quantitative indicators with the graph of the inversely proportional function ($y = 1/x$, where x is the serial number of the territory, and y shows how many times the indicator for the region under the corresponding number is lower than the maximum value in the sample).

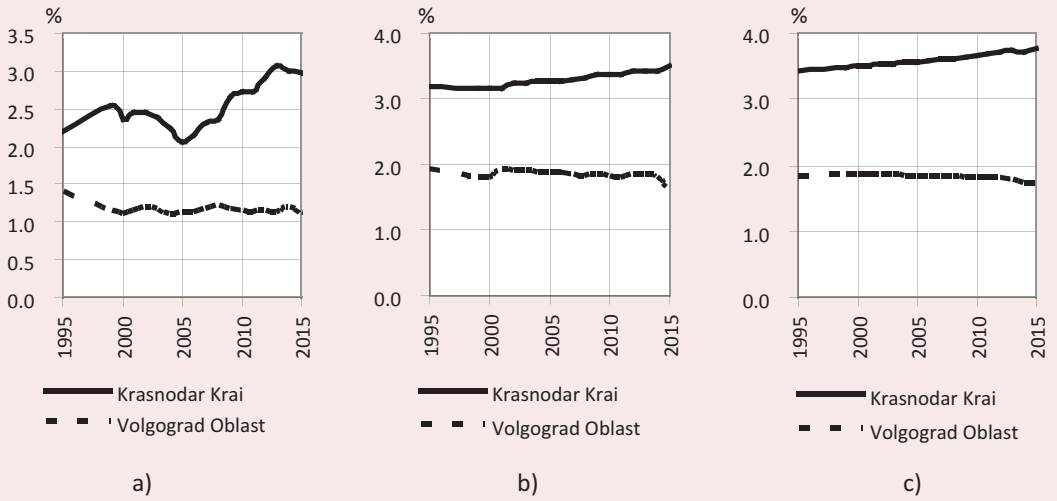
For the purposes of our study, with regard to the territory of the Volgograd Oblast, a non-traditional macroregion was formed; it consists of the subjects that are part of Russia's Southern Federal District, and in addition includes the Saratov and Voronezh oblasts, the regions that have a common border with the region under consideration. From our point of view, this configuration provides the most objective analysis of external conditions that influence the socio-economic situation in the Volgograd Oblast.

Traditionally, the analysis of external conditions is carried out in relation to border territorial formations (subjects of the federation), with a graphical image of the results of such analysis with respect to the maximum value of indicators defined for the subject included in the macroregion. Based on such a comparison, a matrix of strengths and weaknesses is formed as part of the SWOT analysis.

Research results

When assessing the current socio-economic situation, the dynamics of changes in quantitative indicators in most cases are presented in the form of graphs, for example, in comparison with the leading region of a macroregion. With regard to the Volgograd Oblast, this comparison is made with the corresponding characteristics of Krasnodar Krai *(Fig. 1)*. Statistical observations for 1995–2015 were used as initial data for the following indicators:

Figure 1. Traditional definition of the socio-economic situation in the constituent entity of the Russian Federation relative to the leader of the macroregion: a) gross regional product, b) number of jobs in the economy, c) population size*



* Built according to the data from Table 1.

Table 1. Change in the share of regions in the value of the RF indicator, %

Region	1995	2000	2005	2010	2015
Share of GRP in GDP, %					
Krasnodar Krai	2.20	2.36	2.07	2.73	3.00
Volgograd Oblast	1.39	1.12	1.13	1.15	1.13
Share of jobs, in %					
Krasnodar Krai	3.19	3.16	3.28	3.37	3.52
Volgograd Oblast	1.92	1.79	1.88	1.82	1.62
Share of population, in %					
Krasnodar Krai	3.42	3.51	3.57	3.66	3.76
Volgograd Oblast	1.85	1.86	1.85	1.82	1.74
Source: *Russian Statistical Yearbook. 2017: Statistics Collection*. Rosstat. Moscow, 2017. 686 p.					

– gross regional product[5] (gross value added) as a share in the GDP of the Russian Federation, in %;

– the number of jobs[6] as a share in the employed population of the Russian Federation, in %;

– population size[7] as a share in the population of the Russian Federation, in %.

The graphs are based on the statistical information given relative to the values of the Russian Federation; that is, the graphs show the share of the region in the value corresponding to the Russian Federation *(Tab. 1)*. On the basis of graphical analysis we can draw a conclusion about the multidirectional changes in the characteristics under consideration. It should be noted that the changes in value added (gross regional product, GRP, *Fig. 1a*) are subject to the greatest changes in comparison with the population size *(Fig. 1c)* and the number of jobs

[5] *Russian Statistical Yearbook. 2017: Statistics Collection*. Rosstat. Moscow, 2017. 686 p. Table 12.1, p. 258.

[6] *Ibidem*. Table 5.1, p. 109.

[7] *Ibidem*. Table 4.3, p. 87.

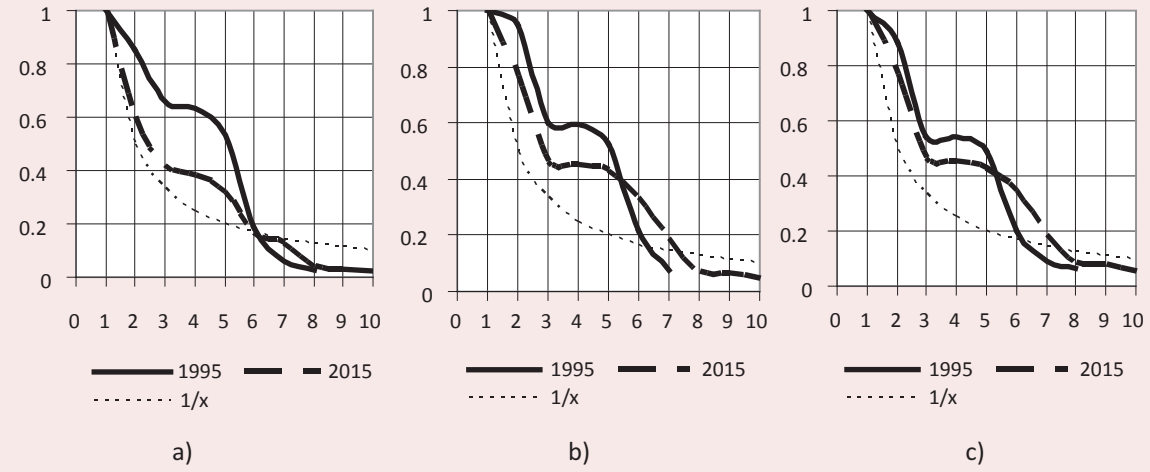
(Fig. 1b). The slower changes in the population of the Volgograd Oblast are explained by the changes in the structure of the sex and age composition in the direction of increasing the average age. The lower dynamics of the changes in the number of jobs compared to GRP is explained by a sufficiently high proportion of jobs created and maintained in the social sphere (at the expense of budgets of all levels).

We did not consider strengths and weaknesses in the framework of the present study, because from our point of view, the results of the SWOT analysis, as a rule, suffer from the subjectivity of assessments and can be used as a supplement when comparing the quantitative values of indicators used to describe the socio-economic situation and development.

The result of the analysis of graphs (see Fig. 1) is usually represented by conclusions about the multidirectional development of the leader and the region under consideration. "Chasing the leader" is the strategy that is most often proposed in order to overcome this situation. Without denying the evidence of such conclusions, it is necessary to pay attention to the graphs that represent the distribution of the values of quantitative indicators arranged in ascending order relative to the indicators of the region that occupies a leading position in the macroregion. The comparison of the graphs that represent the values from the maximum to the minimum value with the inversely proportional function (Zipf curve) can lead to the formation of completely unexpected socio-economic development strategies *(Fig. 2 a, b, c)*.

The dynamics of changes in the quantitative indicators obtained as a quotient obtained by dividing the value of the features of the subject of the Russian Federation by the total value of the corresponding indicator of the Russian Federation as a whole and arranged in ascending order is given in *Table 2*. We use the five-year research period proceeding from the conditions of the most visual representation of the results on the graphs (see Fig. 2 a, b, c).

Figure 2. Deviations of the regions' indicators regions from Zipf's law:
a) gross regional product, b) number of jobs in the economy, c) population size*



* Compiled with the use of the data from Table 2.

Table 2. Distribution of relative values of regional indicators, %

Region	1995	2000	2005	2010	2015
Share of GRP in GDP, %					
1. Krasnodar Krai	2.20	2.36	2.07	2.73	3.00
2. Rostov Oblast	1.87	1.52	1.46	1.75	1.80
3. Voronezh Oblast	1.17	0.86	0.74	0.92	1.27
4. Volgograd Oblast	1.39	1.12	1.13	1.15	1.13
5. Saratov Oblast	1.45	1.10	0.95	1.00	0.95
6. Astrakhan Oblast	0.41	0.52	0.39	0.38	0.49
7. Republic of Crimea	0.00	0.00	0.00	0.00	0.38
8. Adygeya Republic	0.13	0.10	0.09	0.13	0.13
9. Republic of Kalmykia	0.06	0.14	0.05	0.06	0.07
10. Sevastopol	0.00	0.00	0.00	0.00	0.06
Share of jobs, in %					
1. Krasnodar Krai	3.19	3.16	3.28	3.37	3.52
2. Rostov Oblast	3.03	2.90	2.84	2.81	2.69
3. Volgograd Oblast	1.92	1.84	1.88	1.82	1.62
4. Saratov Oblast	1.89	1.79	1.75	1.79	1.59
5. Voronezh Oblast	1.67	1.69	1.58	1.56	1.51
6. Republic of Crimea	0.00	0.00	0.00	0.00	1.18
7. Astrakhan Oblast	0.68	0.66	0.67	0.66	0.66
8. Sevastopol	0.00	0.00	0.00	0.00	0.24
9. Adygeya Republic	0.25	0.24	0.23	0.23	0.21
10. Republic of Kalmykia	0.20	0.18	0.17	0.17	0.15
Share of population, in %					
1. Krasnodar Krai	3.42	3.51	3.57	3.67	3.76
2. Rostov Oblast	3.03	3.03	3.01	2.99	2.89
3. Volgograd Oblast	1.85	1.86	1.85	1.82	1.74
4. Saratov Oblast	1.85	1.84	1.83	1.76	1.70
5. Voronezh Oblast	1.68	1.66	1.62	1.63	1.59
6. Republic of Crimea	-	-	-	-	1.30
7. Astrakhan Oblast	0.69	0.69	0.70	0.71	0.70
8. Adygeya Republic	0.30	0.31	0.31	0.31	0.31
9. Republic of Kalmykia	0.21	0.21	0.20	0.20	0.28
10. Sevastopol	-	-	-	-	0.19

Compiled with the use of: *Russian Statistical Yearbook. 2017: Statistics Collection*. Rosstat. Moscow, 2017. 686 p.
Note. The regions are ranked according to quantitative characteristics for the year 2015.

The graphical representation of the distribution of values of quantitative indicators of constituent entities of the Russian Federation included in the macroregion shows the movement toward the Zipf curve (the thin dotted line). The highest rates of approximation to the dependence described by the inversely proportional function (the Zipf curve) are observed in the indicator "gross regional product" (see Fig. 2a, Tab. 2). This fact confirms the conclusion that the amount of the produced value added to the greatest extent reflects the result of redistribution of resources in favor of leaders at the expense of other subjects of the macroregion. The territory of the Volgograd Oblast, which ranks third in the Southern Federal District throughout the period (1995-2015, see the coordinate with the value 3 on the X-axis), experiences the most dramatic decline in the indicators. It should be noted that such a fall was facilitated by the influence of the progressive growth of the economy of the Voronezh Oblast.

The volume of gross regional product (GRP) in the Volgograd Oblast can be maintained or increased only in the case of a significant increase in GRP in Krasnodar Krai and in the Rostov Oblast or if the economy of the Volgograd Oblast moves from the third to the second place in terms of value added in the Southern Federal District of the Russian Federation. This conclusion can be considered as an example that takes into account the processes that occur in the external environment, without which it is very difficult to form scientifically substantiated long-term development goals.

To assess the growth potential of GRP in Krasnodar Krai and in the Rostov and Voronezh oblasts, it is necessary to perform additional research related to the study of the position of these regions in the group of leaders in the Russian Federation. In our paper, such a task was not set and was not addressed.

The opportunities for changing the position of the Volgograd Oblast in the macroregion (for example, its transition from the 3rd to the 2nd place) are associated with the need to adopt very ambitious goals as a guide for a long-term socio-economic development program. These goals should provide for the achievement of such GRP growth rates, which in the short term will ensure the approach or, better still, the excess of the value added produced, for example, in the Rostov Oblast taking into account the long-term development plan of this territorial entity.

The dynamics of distribution of the values of the number of jobs (see Fig. 2b) allow us to reveal those subjects of the Russian Federation in which the decrease in number of jobs is the greatest (Volgograd and Saratov oblasts). In general, the distribution of values describing the number of jobs approaches the Zipf curve much more slowly than GRP (see Fig. 2a). The lower rate of approach to the inversely proportional function should be explained by the influence of the state, which reduces the number of jobs in the social sphere (education, health, culture, management) much slower than private business structures.

It should be emphasized that the efforts of regional public authorities aimed at preserving existing jobs and creating new ones can significantly change the value added created by the region's economy. At the same time, creating new jobs is not enough. It is important that such jobs are long-term (for example, they function the entire time required to achieve strategic goals). In addition to the duration of jobs functioning, the level of wages in these workplaces is of critical importance. It is not necessary to prove that the amount of wages is a significant, if not the major, factor that influences the decision to change the place of residence. The number of the population expressing willingness to move according to the wage criterion is increasing every year.

The distribution of the population of the regions included in the macroregion approaches the Zipf curve most slowly (see Fig. 2b). The slowest rate of this figure is due to the increase in the proportion of the population of retirement age because of the increase in life expectancy. This category of residents is the least dynamic, since it has a guaranteed income in the form of a state pension and belongs to the number of residents who are more attached to the place of permanent residence.

Discussion

If we omit the details of Zipf's law application in linguistics, then it can be argued that the inversely proportional function (Zipf's law) is used most widely in traditional Russian research on income inequality [8] and in the analysis of settlement systems [5, 7, 9]. A similar picture is observed in the publications

of foreign authors [11, 12]. Assessing the IQ of the population of a region can be named among the non-traditional areas of application of Zipf's law [13, 14]. Attention should be paid to the use of the inversely proportional function in the construction of gravitational models of interaction of urban areas [15], and in the substantiation of specialization of social and territorial associations taking into account globalization processes[16].

The application of Zipf's law in the studies on economic indicators, which in this paper include gross regional product and the number of jobs, is not a novelty. The results of the study of the distribution of value added, and in comparison with the distribution of the inversely proportional function as well, are used to draw conclusions about the impact of economic development on population concentration [17]. In fairness, it is necessary to consider the published findings of the studies that refute any significant impact of economic development on the intensity of the formation of agglomerations in Latin America [18].

Let us pay attention to the popular criticism of the quantitative indicator "gross domestic product" (value added). This criticism, as a rule, is based on the authority of the Nobel Prize winner J. Stiglitz [19, 112]. At the same time, very often, one does not notice the fact that the criticism does not refer to the indicator itself, but to the influence of the financial market on the amount of the produced value added. The growth of this influence is due to the fact that during a sufficiently long period of time the financial market is growing due to the exponential increase in the volume of instruments and transactions that are not related to the actual production of goods or provision of services. In other words, there is an increase in the virtual money supply. We agree with J. Stiglitz' critical thoughts regarding the above specifics. As for the findings of our research, we can say that all Russia's constituent entities included in the study show a slight influence of the financial market on the indicator of gross regional product. From this point of view, the application of GRP (value added) appears to be quite correct.

There is no need to prove the importance and objectivity of the indicator "number of jobs" in a socio-territorial association of the population. As previously emphasized, it is jobs that produce value added in all economic activities, and the amount of monetary remuneration for work forms the volume of consumption in the market of goods. In this regard, the use of this indicator to assess the socio-economic situation in the region should be regarded as an objectively necessary measurement.

Population size is the basis for making decisions on the placement of social infrastructure and for assessing the demand in the housing market, including the capacity of engineering infrastructure. Studying this indicator refers to the necessary and sufficient conditions for the functioning of the territorial planning process. The application of Zipf's law to study the distribution of population in the territory of Russia's constituent entity or macroregion is studied in sufficient detail [6].

The arguments in favor of the fact that the conclusions formed by the use of Zipf's law are significantly influenced by the sample size and by the quantitative and qualitative characteristics of the objects under consideration seem well-founded [10]. Currently, we are trying to assess the impact of the sample size and the subjects included in it on the reliability of the findings, but it will be premature to publish the findings of these studies.

Conclusions

1. Comparison of the results of evaluation of the socio-economic situation of the region relative to the leader in the traditional way (see Fig. 1 a, b, c) and by means of distribution of quantitative indicators (see Fig. 2 a, b, c) allows us to say that the data presented in the form of distribution provide a more accurate assessment. The advantages of a research that uses distribution include the possibility of studying several territorial entities (for example, the present paper considers ten Russia's constituent entities).

We can point out that studying the current situation by comparing the distribution of the objects under consideration with the basic (ideal or theoretical) distribution will allow us to identify general trends of representative subjects, to find a place in this system for a particular region more accurately (in our paper – for the Volgograd Oblast), and to simulate the consequences of the given strategic landmarks.

2. Comparison of value added distributions shows the tendency of quantitative values toward the graph of inversely proportional dependence (Zipf's law, see Fig. 2a), which is typical for a market (competitive) economy. It is important to emphasize that for the representative regions included in the sample, the share of economic activity in the sphere of finance does not have any significant impact on the value of gross regional product (GRP). This fact allows us to say that the dynamics of changes in GRP describes with sufficient accuracy the processes taking place in the economy of Russia's constituent entities.

Gross regional product most closely reflects the processes associated with growth of or decline in economic activity. If the first six territories are characterized by a drop in value added production (GRP) relative to the leader (Krasnodar Krai), then the territories under the numbers 7–10 (see Tab. 2) show minor fluctuations relative to the steady value. Based on the logic of Zipf's law, it is important to emphasize that it is the subjects under the numbers 7–10 that have the greatest potential for growth, which, most likely, will not meet significant resistance from the business located on the territory of the leader (Krasnodar Krai).

3. The graph that depicts the distribution of values describing the change in the number of effective jobs in the economy (see Fig. 2b) shows a slower movement toward the Zipf curve. Such dynamics most likely characterize the degree of state participation in the creation and preservation of jobs in the services sector (social infrastructure). In fact, the share of jobs created and maintained at the expense of budgets of all levels is not less than half of the number of jobs in the non-productive sector of the economy (in the services sector) [20].

On closer examination of the graph that shows the distribution of the employed population we note that the behavior of the curve is somewhat different as compared to GRP. The change in the behavior is due to the presence of the Republic of Crimea in the group of Russia's constituent entities under consideration. The shift of the Astrakhan Oblast toward a lower place indicates that the number of employees in Crimea exceeds that in the Astrakhan Oblast. However, if we pay attention to the distribution of GRP, then we note that the Astrakhan Oblast ranks higher than Crimea (see Tab. 2). The conclusion is obvious: the comparison of the distributions shows that the economic efficiency of jobs in the Astrakhan Oblast is higher.

A similar conclusion can be made when comparing the Volgograd and Voronezh oblasts. By 2015, the Voronezh Oblast was ahead of the Volgograd Oblast in terms of value added. At the same time, the number of jobs in the Voronezh

Oblast is still less than in the Volgograd Oblast.

4. The indicator "population size" should be considered as the most inert and the least responsive to economic changes (see Fig. 2b). This is explained by the fact that quite a large part of the population does not belong to the economically active population (young people under the age of 18 and the older generation above the retirement age). If the majority of young people are not yet able to make independent decisions related to the change of place of residence, then the older generation makes such decisions on the basis of long reflection and careful weighing of the arguments for and against.

The shape of the curve describing the distribution of the population in the representative regions was influenced by the inclusion of the indicator of the Republic of Crimea in 2015. In general, the situation with the distribution of the population is characterized by the lowest rate. In our opinion, the availability of jobs is a major reason determining the choice of the place of residence by the economically active population. And these are not just any jobs in any area of economic activity, but those whose quality (type of activity) and the level of remuneration meet the requirements of employees.

The economic substantiation of the location of production facilities, transport, engineering and social infrastructure should be considered the most important condition, without which strategic territorial planning does not make sense. Our point of view is described in more detail in [21, 22].

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MODELING AND FORECAST OF SOCIO-ECONOMIC PROCESSES

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Methodological Aspects of Predicting the Probability of Bankruptcy on the Example of Pharmaceutical Companies

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Abstract. When it comes to the development of industrial enterprises, there is always the possibility of a crisis; therefore, for continuous sustainable operation it is necessary to develop preventive tools to predict the crisis processes in advance. The present paper covers the objective of developing and testing models for estimating the probability of bankruptcy based on logistic regression for sustainable development of domestic industrial enterprises. The study was conducted within the pharmaceutical industry, yet the methods of development and the testing technique can be applied in other industries. The paper presents the stages of model development (predictor formation, correlation and regression analysis) and its testing (evaluation of statistics parameters, comparative analysis with existing models). The use of the logistics model of bankruptcy assessment helps analyze the correlation between the indicators of enterprise's economic condition and its degree of bankruptcy. Moreover, such a model can quantify the probability of bankruptcy at an industrial enterprise. The reliability and validity of the presented results is confirmed by the generalization of theoretical and methodological studies of experts in this field, the applied results are based on a large amount of financial information of domestic pharmaceutical enterprises and confirmed by the use of algorithms of economic and mathematical modeling recognized in the scientific community. The study used indicators of economic condition based on public reporting of 266 pharmaceutical companies, where one hundred companies were engaged in model development and the rest – its testing. The developed model is able to predict the probability of bankruptcy of pharmaceutical enterprises two

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years ahead. The small amount of calculations and lack of highly technical calculations helps quickly obtain information about the economic condition and versatile calculation makes it possible to conduct a comparative analysis of enterprises in the context of one industry.

Key words: crisis management, modelling, logistic regression, probability of bankruptcy, correlation and regression analysis, elimination method, industrial enterprises, pharmaceutical industry.

Introduction

When it comes to the development of industrial enterprises, there is always the possibility of a crisis. The most important objective of crisis management is to prevent a crisis caused by management errors and ensure most painless recovery amid objectively developing crisis processes [1]. Therefore, crisis processes should be quickly detected in order to prevent them and maintain the functioning of industrial enterprises since timely identification of a crisis helps minimize losses during management.

It is advisable to use models of bankruptcy assessment to identify the crisis, but the methodological issue of this process lies in taking into account industry characteristics. Ignoring such information may lead to incorrect assessment and, as a result, accelerated development of crisis processes at enterprises [2]. In the present article, the research object is pharmaceutical enterprises. The choice of pharmaceuticals is due to intensive development of the industry, its strategic importance for the state and the population, as well as lack of tools for assessing bankruptcy in this area [3].

In order to determine the functional type of relations between the indicators of economic condition and the degree of bankruptcy of an industrial enterprise, the methods of correlation and regression analysis are used. Common methods for assessing bankruptcy are those based on discriminant analysis and logistic regression.

As a result, there is an objective to develop and test a new model of bankruptcy assessment adapted to Russian pharmaceutical companies through econometric modeling.

Literature review

In Economics, modeling and estimating the probability of bankruptcy arose in the 1940s. In works of that time, models were used only for assessing credit capacity and monitoring credit risks. For example, D. Duran developed credit-score models which included only financial aspects of company's activities, such as solvency and credit debt [4].

The area under review rapidly developed in the 1960s. E. Altman began to use discriminant analysis in the development of models for assessing bankruptcy [5]. It was found that the basic condition for using such analysis for modeling is the subordination of discriminant variables to the multinormal law, and the model is the dependence of degree of bankruptcy on basic financial ratios of an enterprise. It should be noted that in certain samples of bankrupt enterprises it is either difficult to determine the normal distribution, or it is not executed at all [6–8]. Moreover, when calculating the integrated index in the models of foreign [8–10] and Russian [11-14] economists, there is an uncertainty interval, in which it is impossible to make an unambiguous conclusion about the probability enterprise's of bankruptcy.

In addition to discriminant analysis since the 1980s, for example, in the work by J. Ohlson [15], models were developed based on logit

regression (logit-model). In [15–17], logit-models are constructed in the absence of the problem of "uncertainty" since the value of a continuous dependent variable is calculated, which takes values in the range from 0 to 1. To construct such models, we need data on both bankrupt and operating enterprises [18–21]. Consequently, logit-models make it possible to analyze the correlation between indicators of enterprise's economic condition and its probability of bankruptcy, while other models only classify an enterprise according to a certain degree of bankruptcy. Moreover, logit-models can not only classify an enterprise, but also quantify the probability of bankruptcy, thus they are more flexible than their analogies.

Despite the advantages of logit-models, [22–24] note a certain subjectivity in calculations of the probability threshold of bankruptcy and the presence of multicollinearity of predictors, which is a factor reducing the model accuracy. This problem is explained by the national peculiarities of accounting policy and industry characteristics of enterprises, which is confirmed in domestic studies.

Russian researchers continued to develop this area, with a great contribution to the development of domestic models and comparative analysis with foreign models noted in works [11, 12, 20, 21]. The analysis of works shows that the authors agree on the high error values in using foreign methods of predicting the probability of bankruptcy; among the applied methods, models based on discriminant analysis and logistic regression have higher assessment accuracy, and the use of models for various industries leads to incorrect research results since each industry has its own characteristics, which affects the inclusion of indicators in the model and their weighing factors.

1. Stages of development of the bankruptcy assessment logit-model

When assessing bankruptcy using the logit model, it is assumed to assess the probability of bankruptcy using enterprise performance. The very nature of such a model is a linear correlation between the base logarithm of integrated index of economic condition (response) and the linear combination of indicators of enterprise functioning [15; 22] and is expressed by the following formula:

$$\ln\left(\frac{S}{1\text{-}S}\right)=a_0+\sum a_i k_i\,, \qquad (1)$$

where S – probability of bankruptcy of an enterprise, S/(1-S) – odds ratio, which determines how many times more often the response takes value 1 than 0, k_i – the predictor (a factor characterizing a certain aspect of the economic condition), a_0 – a free member, a_i – the weighing factor of each predictor.

The presented equation reflects the linear dependence of the probability of bankruptcy depending on the set of values of the enterprise's economic factors. Theoretically, regardless of the regression coefficients a_i and predictors k_i, the model takes any value. Note that the term *logit* comes from the fact that it is possible to get away from linearity in this model using logit-transformation, thus the value of the model will be on the interval [0, 1], which indicates the probability of bankruptcy, where 0 is minimum probability, 1 – maximum. To interpret the coefficients and to simplify the model the exponential form (parts of the equation are exhibited) of the model is typically used:

$$S=\frac{e^{a_0+\sum a_i k_i}}{1+e^{a_0+\sum a_i k_i}}=\frac{1}{1+e^{-a_0-\sum a_i k_i}}\,. \qquad (2)$$

Thus, the first stage of constructing a bankruptcy assessment model using logistic regression is the formation of predictors (k_i).

1.1. Forming an array of predictors

The information framework for the model includes financial statements of pharmaceutical companies[1]. The indicators in the sample were calculated for two groups of enterprises:

1. 72 operating enterprises, as of the beginning of 2018 (excluding enterprises in the process of liquidation or reorganization through merger, division and accession to another legal entity, as well as those in bankruptcy proceedings), S=0;

2. 28 bankrupt enterprises from 2004–2017, for such enterprises S=1.

In our opinion, when forming an array of predictors it is necessary to conduct a dynamic analysis of indicators, which helps determine the development of the industry and crisis periods. For example, due to the crisis processes taking place in the Russian economy in 2014–2015, the indicators of enterprises sharply changed, which affected the deterioration of the overall economic condition, while pharmaceutical enterprises did not go bankrupt. Therefore, the calculation of indicators for such atypical periods may lead to incorrect model values and its low quality.

For bankrupt enterprises, the indicators are calculated for two years before going bankrupt (for example, if the enterprise is declared bankrupt in 2015, the predictors for the array were calculated at the end of 2012). We believe that the two-year period is optimal for introducing anti-crisis measures in order to maintain the functioning of industrial enterprises. For the enterprises of the first group, data for 2014–2015 (crisis periods) and 2016 (did not pass the two-year lag) were not used. It is advisable to use data for 2013, which is more relevant today and quite a favorable period for the pharmaceutical industry.

Thus, the forecast horizon of the constructed model is two years. Note that in the existing models there is either a short forecasting period [21; 23] when the company does not have time to "prepare" for the crisis; or an increase in the forecast horizon [18; 19], which reduces the model accuracy, since the distribution of outcomes for the two groups of enterprises becomes the same.

As a result, the formed sample is an array of data for a certain reporting date, where i-th pharmaceutical enterprise corresponds to a set of indicators of its activity k_1, k_2, ... , k_n, and depending on the status of an enterprise (S), the operating or the bankrupt one is assigned either *0* or *1*, respectively.

It should be noted that after the development of the logistic regression model, there may be a problem with the low accuracy of the forecast, the reason for which is the insufficient amount of historical sampling (observed in the developments of models [11; 14; 21; 24]). The choice of the minimum sample size depends on the distribution of dependent variable values. Under normal distribution, nine or ten predictors are sufficient to describe systems of any complexity, where at least ten observations are required for each predictor [25].

Thus, the historical sample will include 100 enterprises. One of the limitations in constructing a logistic model is the small amount of bankrupt enterprises and reporting on them. As a result, 58 bankrupt enterprises were selected (half of the sample was used for construction, the remaining – for testing). We do not present in-depth analysis of the shares in which to select operating and bankrupt enterprises, the sample quality is still the criterion accuracy of the model. Note that the authors either correlate these groups in equal

[1] The statements of pharmaceutical companies can be found official websites of companies, corporate information disclosure portals and in the system of professional market and company analysis (SPARK Interfax).

volumes [5, 7, 13, 15, 21], or the sample is dominated by the operating enterprises [6, 7, 12, 14, 18–20], since the number of bankruptcy procedures in the industry is always less than the number of normally operating enterprises. We should also add that the fact of enterprises being among historical and test samples is random.

Based on these provisions, we form a sample of indicators according to financial statements of 100 pharmaceutical enterprises. To do this, we select from a set of indicators those that have the following properties:

1. make economic sense and provide an informative, consistent ides of the economic situation;

2. are not highly technical indicators and are calculated according to the data of public reporting;

3. correspond to the nature of the model of bankruptcy assessment and meet the goals and objectives of crisis management of industrial enterprises.

Thus, we selected 18 indicators characterizing enterprises from different perspectives (liquidity, profitability, asset and capital structure, financial viability): sufficiency of own working capital (K_1), flexibility of own current assets (K_2), share of receivables in assets (K_3), share of short-term liabilities in the capital structure (K_4), ratio of immobilized and mobilized assets (K_5), current liquidity (K_6), quick liquidity (K_7), absolute liquidity (K_8), financial leverage (K_9), financial dependence (K_{10}), debt coverage (K_{11}), return on equity (K_{12}), gross margin (K_{13}), return on assets (K_{14}), return on equity (K_{15}), sales margin (K_{16}), return on working assets (K_{17}), degree of solvency (K_{18}).

The sample did not include turnover indicators as they have underestimated values at industrial enterprises. Instead, liquidity and profitability indicators, which quickly respond to changes in the economic condition of enterprises, are included.

Next, it is necessary to check the distribution of selected indicators for normality. To test the hypothesis that the sample belongs to the normal distribution law (empirical distribution corresponds to expected distribution), we use the Kolmogorov-Smirnov test.

The exclusion of indicators from further calculation should be determined by the significance level. If $p>0.05$ then empirical distribution under study corresponds to normal distribution, in the opposite case the distribution differs from normal. For example, the distribution of values of variables K_1 and K_3 is not statistically different from normal since $p>0.05$ and error probability is negligible. K_2 variable has a significance level below the set level, therefore, the values do not obey normal distribution and it is necessary to exclude this indicator from further model construction.

According to the results of normality test, the following indicators are selected for further model construction: K_1, K_3, K_4, K_6, K_7, K_{10}, K_{11}, K_{13}.

1.2. Correlation analysis

Within this stage it is necessary to:

1. create a matrix of paired correlation indices;

2. using the Chaddock scale, identify mutually correlated indices (a negative value indicates the opposite correlation between variables), one of which is excluded from further calculation. Such a reduction in the number of indicators can reduce their number, while the level of economic condition assessment of an enterprise is not reduced;

3. select the indices without a strong and close correlation, in which the critical level of the correlation index is not more than 0.7. The selected indices are the basis for further construction of the logistic regression equation.

Table 1. Matrix of pair correlation indices

K	K_1	K_3	K_4	K_6	K_7	K_{10}	K_{11}	K_{13}
K_1	1.000	0.306	-0.663	0.872	0.658	-0.606	0.813	0.179
K_3	0.306	1.000	0.227	0.121	0.445	0.032	0.290	0.284
K_4	-0.663	0.227	1.000	-0.717	-0.523	0.749	-0.438	-0.119
K_6	0.872	0.121	-0.717	1.000	0.735	-0.588	0.762	0.154
K_7	0.658	0.445	-0.523	0.735	1.000	-0.502	0.607	0.279
K_{10}	-0.606	0.032	0.749	-0.588	-0.502	1.000	-0.673	-0.097
K_{11}	0.813	0.290	-0.438	0.762	0.607	-0.673	1.000	0.052
K_{13}	0.179	0.284	-0.119	0.154	0.279	-0.097	0.052	1.000

During the analysis of matrix pair correlation indices presented in *Table 1* it is advisable to exclude from further research: K_1, K_4, K_6. The sufficiency of own working capital (K_1) index is closely correlated with debt coverage (K_{11}) index and current liquidity (K_6) index. In turn, K_6 has a high pair index with the majority of indicators. Besides being closely correlated to K_6, the share of short-term liabilities in the capital structure (K_4) index is also highly interdependent with the financial dependence (K_{10}) index.

According to the results of the correlation analysis, further development of the logistic regression model for assessing the bankruptcy of pharmaceutical enterprises will be based on the following indices with normal distribution, where paired correlation indices are not closely correlated with the indicators:

1. share of receivables in assets (K_3);
2. quick liquidity (K_7);
3. financial dependence (K_{10});
4. debt coverage (K_{11});
5. gross margin (K_{13}).

1.3. Regression analysis

This stage implies the construction of the logistic regression equation. We note that it is inappropriate to have an absolute term in the equation. From the theoretical point of view, if all economic indicators (predictors) equal 0, the probability of bankruptcy will be calculated based on the size of the absolute term. In real economic processes, if all indicators equal 0, the industrial enterprise does not function, therefore it is recognized non-operating.

Thus, the logistic regression model will not contain free term, *Formula 2* is transformed into the following equation:

$$S = \frac{e^{\sum a_i k_i}}{1 + e^{\sum a_i k_i}} = \frac{1}{1 + e^{-\sum a_i k_i}} . \quad (3)$$

The regression equation was constructed using the method of eliminating (backward likelihood ratio) the remaining indices. This method involves the inclusion of all predictors in the regression equation. Later, at each step there is an exclusion of the least "useful" ones, that is, predictors with minimum *F*-statistic value, this value should be less than the preselected threshold. The *F*-statistic assessment helps exclude predictors with an insufficient influence on the explained variable. The IBM SPSS Statistics 17.0 complex, in which the model is calculated, calculates *p-value*, and the exclusion of predictors ends when all of them satisfy the expression $p_i < p$, where p_i – significance level of each predictor, p – a threshold value of 0.01.

Table 2 demonstrates statistic characteristics of the regression analysis for the construction of

Table 2. Parameters of logistic regression model

Step	Predictor (K_i)	Predictor weighing factor (a_i)	Standard error	Walt test	Degree of freedom	Level of significance (p)
1	K_3	-0.755	1.850	0.167	1.000	0.683
	K_7	-1.154	0.977	1.394	1.000	0.238
	K_{10}	2.336	0.807	8.378	1.000	0.004
	K_{11}	-0.479	0.576	0.693	1.000	0.405
	K_{13}	-4.183	1.449	8.332	1.000	0.004
2	K_7	-1.339	0.891	2.259	1.000	0.133
	K_{10}	2.183	0.699	9.741	1.000	0.002
	K_{11}	-0.502	0.578	0.754	1.000	0.385
	K_{13}	-4.147	1.437	8.331	1.000	0.004
3	K_7	-1.947	0.598	10.584	1.000	0.001
	K_{10}	1.984	0.633	9.829	1.000	0.002
	K_{13}	-3.970	1.415	7.875	1.000	0.005

a logistic model for assessing bankruptcy. Based on the presented data, two predictors were excluded, as the significance level was 1% higher than the threshold value:

1. at the first step, share of receivables in assets (K_3) index is excluded: 0.683 > 0.01 (condition $p_1 < p$ is not met);

2. at the second step, debt coverage (K_{11}) index is excluded: 0.385 > 0.01 ($p_1 < p$ is not met).

The indices of the regression equation (a_i) determine the effect of the corresponding indicators (predictors) on the integrated index of the economic condition of an industrial enterprise. Based on this, gross margin (K_{13}) index has the largest contribution to the value of the final indicator. By the last step, the values of Wald test as a criterion for the significance of each a_i for the corresponding predictor do not have strong deviations among themselves, which indicates that the model is appropriate.

Further, calibration test will be applied for testing the model and evaluating the obtained indices of the regression equation. The test determines the degree of correspondence between estimated probabilities of bankruptcy predicted by the model and the real probabilities of defaults.

Based on statistics of 100 Russian pharmaceutical enterprises divided into operating enterprises and bankrupt enterprises, with the use of normality test, correlation analysis and the likelihood ratio method, we constructed a logistic model which determines the probability of bankruptcy 2 years before its occurrence.

In order to improve the regression analysis procedure and, as a consequence, improve the quality of models for assessing bankruptcy, methodological aspects of construction were clarified:

1. the use of data on enterprises of one industry: each industry has its own functioning characteristics; the inclusion of enterprises from other industries changes the levels of predictors and creates a multidirectional assessment (the aspect is not taken into account in models [15; 18–20]);

2. the inclusion in the study of at least a quarter of enterprises declared bankrupt: a small amount of actual data on bankrupt enterprises underestimates the final assessment (a small amount of such data is present in the models [19; 23; 24]);

3. adding to the analysis the normality test of distribution of each predictor in the data array (absent in models [17; 20; 22]).

According to *Formula 3* and based on data from Table 2, the logistic model is the following:

$$S = \frac{1}{1 + e^{1.95K_{ql} - 1.98K_{fd} + 3.97K_{qm}}}, \quad (4)$$

where S – probability of bankruptcy (an integral indicator of the economic condition of a pharmaceutical enterprise), K_{ql} – quick liquidity (ratio of current assets minus inventories to short-term liabilities), K_{fd} – index of financial dependence (share of borrowed funds in the capital structure), K_{gm} – gross margin (ratio of gross profit to sales revenue).

The development of logit models does not involve an interval assessment of the final indicator (S) since the point value of the probability of bankruptcy is calculated. But it should be noted that when using this model for management decision-making, it is necessary to take into account the critical levels. Applying the method [20] taking into account the actual distributions of model values for the calculated sample, two levels were identified that determine the stable (favorable) economic condition (S<20%) and the zone of acute crisis at a pharmaceutical enterprise (S>80%).

2. Testing the developed model of bankruptcy assessment

For practical application of the developed model it is necessary to test the model for accuracy of predicted results. In our opinion, the testing process should be carried out in two stages.

2.1. Estimation of statistical parameters of the model based on the initial sample

Let us consider the results of observed and predicted outcomes (bankruptcy) with the null model and the final model presented in *Table 3*.

The null model represents the equation of logistic regression, where weighting factors (a_i) of every predictor equal 0. In turn, the final model is constructed by elimination and is reflected in Formula 4. It should be noted that the boundary for division of predicted outcomes is 50%, with 1 – the enterprise is declared bankrupt, 0 – the enterprise is operating.

The resulting regression model has forecasting power if its accuracy is higher than the accuracy of the null model. In the initial model, the total percentage of correctly predicted bankruptcies is 28%, but in the final model it increases almost three times to 79%. We specify that the considered accuracy shows the degree of correct outcomes calculated using the regression model for the historical (initial) sample of pharmaceutical enterprises.

To justify the appropriateness of the model we consider the statistical criteria for assessing the quality of the final model.

The value of the (*-2LogL*) logarithm function of the likelihood ratio in the final model decreased by 41% compared to the initial

Table 3. Observed and predicted outcomes of historical sample

Null model		Predicted outcomes		Share of correct outcomes
		0	1	
Observed outcomes	0	0	72	0%
	1	0	28	100%
Total accuracy of null model				28%
Final model		Predicted outcomes		Share of correct outcomes
		0	1	
Observed outcomes	0	63	9	88%
	1	12	16	57%
Total accuracy of null model				79%

model and amounted to 81.23. The decrease in this indicator, which is the result of comparing two models, indicates an improvement in the forecast capacity of the model.

As a rule, to assess the quality of regression models the determination index is used, but for logistic models, the determination index is not the basic parameter for determining the accuracy, unlike linear regression models. Therefore, the pseudo determination coefficient *Nagelkerke R-square* is calculated – 0.582, which is an approximation of the determination index taking into account the function *-2LogL* and *X*-square. The indicator characterizes the degree of change in the probability of bankruptcy depending on indicators included in the model; therefore, the change in the probability of bankruptcy of pharmaceutical enterprises 58.2% depends on the indices of quick liquidity, financial dependence and gross margin. Low *R*-square values for logit models are normal. In contrast to linear regression, it is impossible to suggest constant variance in logistic regression: the binary variable variance depends on the frequency of value distribution of the variable itself, so the calculated determination indices are an approximate measure [11].

Therefore, for additional evaluation of the model and its parameters we consider the calibration test via the Hosmer-Lemeshow goodness-of-fit test. This test calculates the intervals between observed and predicted frequency distributions of bankrupt and operating enterprises. The value of the index under review should be higher than the significance level of 0.05. In the author's model, the significance level is 0.31 (at X-square=9.39 and *df*=8), which is six times higher than the established level.

Thus, the considered characteristics indicate that the obtained model is well calibrated, is sufficiently accurate in terms of forecasting bankruptcy and can be effectively used in practical calculations.

2.2. Accuracy assessment and comparative analysis with existing models in the test sample

To confirm the results and apply the developed model an important condition is its testing at pharmaceutical enterprises that are not included in the initial (historical) sample. For the second testing stage a similar array of data on the economic condition of pharmaceutical enterprises was formed:

1. for 136 operating enterprises;
2. for 30 bankrupt enterprises.

Table 4 presents the results of the author's model of bankruptcy assessment using the initial and tested samples. The intercept margin of outcomes is maintained at 50%.

Table 4. Observed and predicted outcomes of historical sample

Initial sample		Predicted outcomes		Share of correct outcomes
		0	1	
Observed outcomes	0	63	9	88%
	1	12	16	57%
Total accuracy of initial sample				79%
Tested sample		Predicted outcomes		Share of correct outcomes
		0	1	
Observed outcomes	0	109	27	80%
	1	8	22	73%
Total accuracy of tested sample				79%

It should be noted that the 50% intercept margin is conventional and does not fully reflect the accuracy of the model. The forecasted probability of bankruptcy of some operating enterprises fluctuates around this boundary. For example, when the intercept margin is increased by 10 percentage points (up to 60%), the model accuracy for existing enterprises increases by 7 p.p. and the overall model accuracy for the tested sample is 83%. Despite this, the share of correct outcomes according to the calculations on each sample fluctuates at the same level, which characterizes the adequacy of the model.

Having determined the accuracy criteria of the developed model, we proceed to the comparative analysis of the model with other common models of bankruptcy assessment adapted to industrial enterprises.

Since comparative analysis uses logit- and MDA-models a necessary condition for proper studies is the distribution of enterprises into equal groups according to the probability of bankruptcy.

For logit-models (author's, Zhdanov's [21], Khaidarsina's [20]) five groups with the same interval of probability of bankruptcy (20 p.p. each) are distinguished, where the group "0%–20%" characterizes minimum risk of bankruptcy, and "80%–100%" – maximum.

Groups of bankruptcy probabilities (five groups) of Muradov [11] and Irkutskaya [12] models will correspond to similar groups for logistic models. Groups of bankruptcy probabilities according to Vishnyakov's model [14] correspond to groups "0%–40%" with minimum and "60%–100%" with maximum risk of bankruptcy. Bankrupt enterprises according to Kolyshkin's model [13] will be part of the group "60%–100%", prosperous ones – "0%–40%", the remaining groups will be in uncertainty zone.

Thus, the distribution of pharmaceutical enterprises of the tested sample was obtained in five groups for comparative analysis of models for enterprises recognized as bankrupt and for operating enterprises (see *Table 5*).

In our opinion, when the models use extended grouping of enterprises, the subject of management, when choosing a more accurate model and its further application, is

Table 5. Distribution of pharmaceutical companies by group of bankruptcy probabilities

Model	Groups of bankruptcy probability					Total enterprises
	0%–20%	20%–40%	40%–60%	60%–80%	80%–100%	
Distribution of bankrupt pharmaceutical enterprises						
Author's	4	2	4	3	17	30
Khaidarshina's	15	–	–	–	15	30
Kolyshkin's	6	–	1	1	22	30
Zhdanov's	11	1	–	–	18	30
Irkutskaya's	10	–	1	–	19	30
Muradov's	5		8	17		30
Vishnyakov's	5		–	25		30
Distribution of operating pharmaceutical companies						
Author's	94	10	14	14	4	136
Khaidarshina's	122	4	–	1	9	136
Kolyshkin's	85	12	11	13	15	136
Zhdanov's	103	1	3	3	26	136
Irkutskaya's	89	1	6	7	33	136
Muradov's	77		38	21		136
Vishnyakov's	56		–	80		136

required to compare the share of enterprises whose economic condition was incorrectly forecasted. For example, this aspect is very important for analyzing bankrupt enterprises, where it is necessary to identify the minimum forecasted probability of bankruptcy at actual bankruptcy. Incorrect forecasting may lead to inadequate assessment of the enterprise's economic condition, lack of anti-crisis measures and early liquidation of business. As a result, the calculation of accuracy of models will be determined by the following formula:

$$P = 1 - \frac{\sum N_{S > S_k}}{N}, \quad (5)$$

where P – model accuracy, N – total number of enterprises, $N_{S>Sk}$ – number of enterprises with the calculated probability (S_i) greater than (less than) the set level (S_k): for bankrupt enterprises $S<40\%$, for operating enterprises $S>60\%$. The interval "40%–60%" represents the uncertainty zone, the average probability for evaluation, so the enterprises in this interval are excluded from the calculation of accuracy.

According to the results of calculating the accuracy presented in *Table 6*, the total accuracy of only three models is higher than 80%: Kolyshkin's model, Khaidarshina's model and the model proposed by the author.

Significant drawbacks of Khaidarshina's logistics model is the highest predictive power for operating (P=92.6%) and at the same time the lowest for bankrupt enterprises (P=50.0%), as well as a large number of indicators in the model. Vishnyakov's model has a similar forecasting imbalance showing the lowest accuracy for operating enterprises (P=41.2%) and one of the best results for bankrupt enterprises (P=83.3%).

It is necessary to highlight Kolyshkin's model showing relatively similar accuracy for the two groups of enterprises. But since this model is based on discriminant analysis it is impossible to determine the exact probability of bankruptcy. Moreover, 27.7% of enterprises are in zone of uncertainty (average probability), which makes it difficult to assess and predict future business development (according to the author's model, only 10.8% of all enterprises are in the group "40%–60%").

The author's model has the highest accuracy (P=85.5%) among the analyzed models; it has no significant differences in the degree of accuracy between operating and bankrupt enterprises.

Conclusion

In the course of the study, using correlation and regression analysis, a model for assessing the probability of bankruptcy of industrial enterprises (for example, enterprises of the pharmaceutical industry) was developed and tested.

The process of construction and testing is based on financial statements of 266 domestic pharmaceutical companies, so the industry aspects are fully taken into account. The

Table 6. Accuracy of models for assessing the bankruptcy of pharmaceutical enterprises

Model	Bankrupt enterprises	Operating enterprises	All enterprises
Author's	80.0%	86.8%	85.5%
Khaidarshina's	50.0%	92.6%	84.9%
Kolyshkin's	83.3%	84.6%	84.3%
Zhdanov's	80.0%	79.4%	79.5%
Irkutskaya's	60.0%	78.7%	75.3%
Muradov's	66.7%	70.6%	69.9%
Vishnyakov's	83.3%	41.2%	48.8%

absence of a large amount of calculations and highly technical calculations helps quickly obtain information about the economic condition. The model uses three indices describing enterprise activities from different aspects: liquidity, financial stability, profitability. The flexibility of calculations makes it possible to conduct a comparative analysis of the economic condition of enterprises in the context of one industry. The model determines the probability of bankruptcy two years ahead, which gives a sufficient opportunity to implement anti-crisis measures for maintaining sustainable development of a business.

The article also outlines stages and highlights methodological aspects of constructing a model for assessing the probability of bankruptcy not taken into account in the existing studies, which are aimed at increasing the forecast quality.

The necessary steps in model development are checking the indicators for normality of distribution and excluding closely correlated indicators, which increases its effectiveness. When testing the model, it is advisable not only to calculate the statistical parameters of the equation, but also to assess the accuracy of a new sample of enterprises and conduct comparative analysis using the existing methods.

The application of the proposed methodology for monitoring enterprises helps forecast crises, detect their causes, prevent bankruptcy and maintain sustainable business development. The algorithms of development and testing discussed in the article can be applied to other economic sectors.

The research materials can be used by: owners and managers of enterprises in order to build a monitoring system; commercial banks in corporate lending and credit risk monitoring; consulting organizations and investors to conduct analytical studies in the industry and assess investment climate; executive authorities for implementing the industrial policy and performing control and supervisory functions.

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Russian Industrial Sector Development in the Context of New Technological Revolution*

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Abstract. The rapid spread of new technologies in all areas of human activity leads to rapid and profound changes in the structure of industrial production, global markets and the economic and social sphere. Modern developed countries seek growth sources on the basis of scientific and technological potential emerging in new information, digital and industrial technologies. Their development results in new technological revolution and accelerated productivity growth. In this regard, scientific understanding of organizational and methodological problems to form a technological basis for Russian economy growth in the context of global transformation of the world labor division system under the influence of large-scale introduction of innovative technologies of the fourth industrial revolution will develop a paradigm and methodological tools for further implementation and successful realization of digital economy in the country, focused on improving industrial production efficiency through the use of new technologies. The purpose of this article is to study trends in formation and identification of problems to develop the Russian industrial sector in the context of new technological revolution. The paper generalizes theoretical foundations of the essence of innovative reforms in the economy in the fourth industrial revolution; analyses a state and trends of scientific and technological development of the country's industrial sector, estimates a degree of readiness of its transition to digital economy; reveals functional possibilities of improving quality characteristics of the industrial sector; and determines directions of its state regulation in the conditions of digital transformation.

Key words: new technological revolution, digital economy, industrial sector development.

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Introduction. In recent decades, the world is rapidly moving to a new type of economy, with the main development tool being digital technologies. At the present stage of development, digital technologies are the main factor in technological changes, the most important condition for the competitiveness of both individual enterprises and countries. They ensure the restructure of all economic and production processes, significantly increase productivity, improving the quality and reducing the cost of goods and services.

By bringing collection, aggregation and exchange of accumulated information to a fundamentally different quality level with minimal role and degree of human participation, new technologies are becoming drivers of the fourth industrial revolution characterized by the merge of technologies and blurred boundaries between the digital and industrial sphere.

In the context of the fourth industrial revolution, industrialized countries have set themselves large-scale structural reindustrialization objectives, considering digital technologies as an accelerator of growth in world production performance. By 2025, the share of industry in GDP of OECD countries should be 20% of GDP against the current 15% in the EU and 12% in the US.

The status of Russia's high-tech sector of the economy is defined as catching up. This is confirmed by the opinion of the vast majority of researchers, experts and politicians who point to low competitiveness of domestic industry due to technological backwardness [1].

In this regard, the scientific understanding of organizational and methodological foundations of the introduction of technologies of the fourth industrial revolution will ensure successful implementation of the digital economy focused on improving the efficiency of industrial production. This represents the purpose of the presented paper.

The following objectives are aimed at achieving this purpose:

1) study the theoretical basics of innovative reforms in the economy in the fourth industrial revolution;

2) analyze the state and trends in scientific and technological development of the Russian industrial sector, assess the degree of readiness for the transition to the digital economy of the region and determine the functionality to improve its quality characteristics amid the transition;

3) determine the areas of state regulation of the Russian industrial sector amid digital transformation.

Theoretical aspects of the research. The current changes in the world have a significant impact on Russia's development. In the first half of the 21st century, in addition to "major challenges" such as exhaustion of traditional resources and their reduced management efficiency, population reduction and population ageing, lagging behind industrialized countries in life expectancy, Russia faces specific challenges, one of which is the participation in the new technological revolution [2]. This process is complicated by the introduction of sectoral sanctions by the EU and the US in 2014, which revealed a number of areas where Russia is not yet able to compete. The decline in world oil prices in 2015, in turn, not only increased the systemic economic crisis, but also raised the issue of Russia's need for radical diversification of the national economy which still largely depends on energy exports: in 2016, fuel and energy products accounted for 62% of all Russian exports to foreign countries.

One of the possible ways to solve these problems, as well as to respond to the challenges the Russian economy is currently facing is to

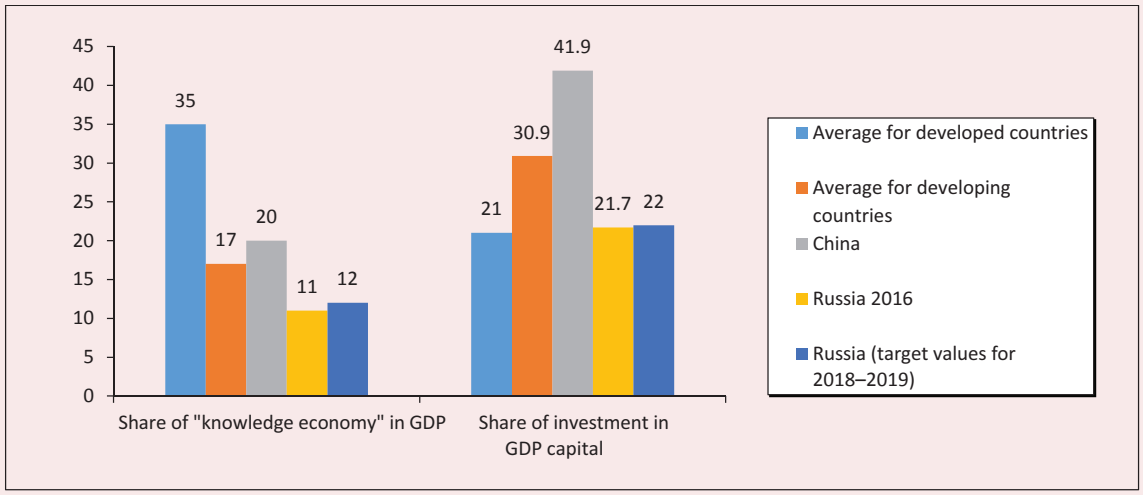
include Russia in the new technological revolution. However, we should understand that Russia's situation with the large-scale technological and industrial modernization differs from similar processes in countries that already implement similar programs [3].

The main drivers of the new economy are intangible assets, cooperation of innovation participants, company's cognitive abilities and human abilities. It is these components of competitiveness in the global markets of new goods and services that need target support. A human and a cognitive subsystem and related industries make up the "knowledge economy" [4]. In countries leading in new technologies, this understanding is reflected in the structural investment policy covering the branches of "knowledge economy" and basic industrial sectors (*Fig. 1*).

The negative trends in Russia's development of knowledge economy and the national economy as a whole can be overcome by shifting towards a new model of economic growth through the introduction of new advanced technologies that significantly increase productivity. At the same time, the country significantly lags in a number of scientific and technological indicators, which should be the subject of state policy aimed at addressing the problems of new industrialization. Within the framework of this policy, it is necessary to set clear goals, objectives, structural and technological priorities, form appropriate tools and support mechanisms for their successful implementation [5].

Note that the development of global industrialization (mid-18–19th century) was accompanied by rapidly growing productive forces [6]. The transition of the economy to industrial production was facilitated by the first industrial revolution, which ensured the transition from manual to machine labor. It is traditionally linked with the invention of a steam engine in the 17th century. The second industrial revolution (20th century) was connected with electrification and helped organize belt-line production of cars at first, and

Figure 1. Share of "knowledge economy" and fixed capital investment, % of GDP



Source: Nikonova A. The potential and tools of growth of innovative industries in the process of formation of a new way of economy: a system approach. *Economist*, 2018, no. 10, pp. 20–39.

later – of many other goods. At the beginning of the 21st century, economic progress was ensured through the achievements of the third industrial revolution, which is based on the shift towards renewable energy, the introduction of computers, and industrial automation.

J. Rifkin identified five principles or pillars on which the third industrial revolution is based: 1) shifting to renewable energy; 2) transforming the building stock of into micro-power plants; 3) deploying hydrogen; 4) using Internet technology; 5) producing electric vehicles [6]. Consequently, it can be noted that the features of the third industrial revolution are not yet observed globally and their important property is lack of synchronicity of distribution.

However, many researchers believe that the world is on the threshold of the fourth industrial revolution, involving the introduction of cyber-physical systems in production (Industry 4.0).

According to the German economist K. Schwab, a fundamental difference of the fourth industrial revolution is the synergy effect that arises from the merge of different technologies: computer, information, nano-technology, bio-technology, etc. Another feature may be the blurring boundaries between the physical, digital (information) and biological (including human) world. The main features of the fourth industrial revolution are the "ubiquitous" mobile Internet, miniature production devices, artificial intelligence, and learning machines [7].

To date, the most developed countries are shifting from industrial to information society, forming Industry 4.0, which characterizes the organization of production processes based on network interaction of technologies and devices in the value added chain, and implies continuous communication at all levels. According to Klaus Schwab, Chairman of the World Economic Forum in Davos, the fourth industrial revolution is characterized by technological breakthroughs in artificial intelligence, robotics, the Internet of things (IoT), self-driving cars, 3D printing, nano-technology, bio-technology, materials science, energy storage and quantum computing.

Analysis of the current state of research in this area has shown that the global industrial strategy reveals a fundamental innovation – the development of information and communication technologies is no longer considered as one of the goals of growth and development, but as a source of systemic transformation of the entire industry and the economy as a whole. A clear illustration of the widespread digital technology in many areas of the modern society is rapidly growing capitalization of IT companies. In recent years, IT companies rank firs in the list of the most expensive companies in terms of capitalization. A similar pattern is observed among expensive brands in the world. The top 10 most valuable brands according to Forbes includes five IT companies represented by Apple, Google, Microsoft, Facebook, and IBM.

At this stage of industrial development, electronics, computer, information and Internet technologies cover the entire economy, ensuring horizontal and vertical integration of all business processes. The introduction of network interaction between machines, buildings and information systems changes the "paradigm" of technological development and forms a new digital economy [8, 9].

According to the study, nowadays there is no common understanding of the phenomenon "digital economy" in the world. Many researchers agree that the very concept of "digital economy" appeared in the 1990s. The ideology of the concept under study in 1995 was outlined by Nicholas Negroponte. The American computer scientist described

digital economy in the form of the following metaphor: "the transition from the movement of atoms to the movement of bits".

A number of researchers understand digital economy as an area of economy in which processes of production, distribution, exchange and consumption operate on the basis of digital technologies. Others consider the concept from the philosophical and conceptual point of view, considering digital economy as a new socio-cultural and economic reality, a new civilization based on the use of binary codes and the result of a new digital product and capital, and in the future – new relations, augmented reality (transformation of nature and industrial relations, changes in their subject-object focus, according to K. Schwab – the transformation of mankind) [7, 10].

The definition of digital economy is reviewed in the Strategy for the information society development in Russia for 2017–2030, published in December 2016, where digital economy is referred to as activities with the key factors being data in digital form [11].

Note that the interpretation of the terms "the fourth industrial revolution" and "digital economy", the definition of their relations is ambiguous in the works of foreign and domestic experts. In this article we consider digital economy and its technologies as the basis for the fourth industrial revolution.

It is known that the set of technologies characteristic of a certain level of production development represents a technological mode. This term was introduced by Russian economists D.S. Lvov and S.Yu. Glazyev. According to S.Yu. Glazyev, the scientific and technological progress triggers a transition from lower to higher, progressive modes [12]. Each of these modes covers a closed reproduction cycle from mineral extraction and training to non-production consumption. This thesis is supported by C. Perez, who argues that the new techno-economic paradigm is developing in the process of diffusion of new technologies, which leads to their multiplicative impact on the economy, changing the socio-institutional structures [13].

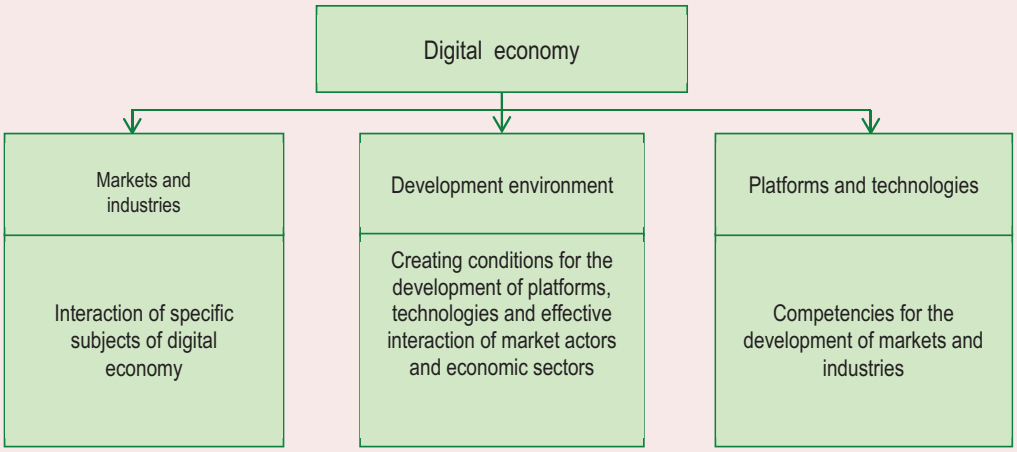
Thus, it is possible to define the techno-economic paradigm as a set of the most successful and profitable practices that exist amid the need to choose the primary material, methods and technologies within organizational structures, business models and strategies. These mutually compatible principles and criteria are developed through using new technologies, overcoming obstacles and finding the most appropriate procedures, established practices and structures. Thus, digital economy as a new form of economic activity of the society and socio-economic relations within it is a response to the changes occurring in the world during the transition from one state to another, from the fifth to the sixth technological mode. It is this form that will become the basis for maintaining and increasing the countries' pace of socio-economic development.

The modern digital economy is formed as a result of close interaction of three levels (*Fig. 2*).

Digital economy is based on the most promising technologies, which, according to researchers [14, 15], will have the most significant impact on various fields of activity in all world countries: artificial intelligence, augmented reality, VR, unmanned aerial vehicles, block chain, Internet of things, 3D printing, robotics, etc.

In the framework of digital economy, the world is moving to a different – technogenic – civilization, with a decisive role of constant search and application of new technologies in its development: not only production, but also technologies of social communication and social management. In fact, it should be about

Figure 2. Levels of interaction of digital economy



the development of a country in a completely different economic environment, the environment of the so-called digital transformation, whose characteristics are the following:

– prevalence of information exchange over the exchange of physical objects in economic activity;

– knowledge (intellectual capital) rather than money (financial capital) becomes the predominant economic resource and instrument of power);

– the Internet is becoming the predominant means of mass communication;

– a network organization, rather than a hierarchy, is the prevailing organizational structure;

– self-organization (as a bottom-up management) and evolution, which sets changes from simple to complex, becomes the predominant development methodology;

– the prevailing level of information exchange is global, rather than regional or local [16].

Thus, a review of research in this area helps conclude that the change of the paradigm of economic development, the transition to a new technological revolution and the formation of digital economy is becoming extremely important for Russia.

Description of research methods. The methodological framework of the study lies in a comprehensive analysis of the development of Russia's industrial complex in the context of the new industrial revolution and economic development, focused on the introduction of digital and information technologies, serving as a technological framework for Russia's economic growth.

The logic of the study is based on analysis of two factors which we consider basic for a successful transition to a new model of technological development – the achievement of a high level of scientific and technological development of the industrial sector of economy and the implementation of effective state policy aimed at improving the mechanisms of development of Russia's industrial sector amid the new industrial revolution.

In order to identify the effect of digital technologies on the industrial sector, determine the directions of its transformation, we form an empirical framework covering the indicators of innovative economic development, as well as indicators of the real economy development.

The information framework of the study is the research of domestic and foreign economists in the field of scientific, technological and innovative development, regional economy, public administration; of researchers engaged in studying industrial and technological development, formation and implementation of the industrial policy in their correlation with the socio-economic modernization in the new industrial revolution.

Moreover, we conducted a sociological questionnaire survey into the level of scientific and technological development of the industrial sector and its readiness for the transition to information and communication technologies in the fourth industrial revolution. The sample consisted of 50 respondents who are heads of industrial enterprises in the Vologda Oblast. The in-depth research was conducted using this region as a basis since the region is industrially developed, and because it is a typical Russian region characterized by negative trends inherent in innovation and scientific and technological development. The sociological survey made it possible to assess the scale, nature and level of development of the fourth industrial revolution, as well as the emerging trends that cannot be estimated solely by quantitative indicators.

The combination of these methods made it possible to create a framework for proposals on the implementation of effective state policy aimed at improving the mechanisms of Russia's industrial development amid the new industrial revolution.

The main research results. The peculiarity of the modern world economic development is the construction of the economy based mainly on generation, dissemination and use of knowledge by world's leading countries. According to expert estimates, in recent years the vast majority of GDP growth (up to 90%) in developed countries has been generated by new knowledge-intensive products resulting from the commercialization of research and development (R&D). For Russia, the transition from an exports-commodity to an innovative type of development is also the main goal of the state policy in science and technology, a necessary prerequisite for economic modernization to ultimately ensure the competitiveness of domestic production. Therefore, the development of science and innovation, investment in intellectual capital are important components of success in achieving sustainable economic growth.

The objective of innovative development of Russia's economy is very large-scale due to its significant technological lag behind developed countries. Thus, according to the integrated Global Innovation Index[1], which, on the one hand, characterizes the opportunities for change, on the other – the final results of innovation, Russia occupies a middle position, being behind developed European countries and the United States (*Tab. 1*).

Currently, world's developed countries are undergoing active processes of new industrialization, involving the revival and further development of the real economy based on most advanced technologies.

In Russia, the digital agenda initiative in industry has become possible thanks to the implementation of similar initiatives by Western countries (*Tab. 2*).

Thus, these data suggest that global competition in the markets of production technologies is increasing. In order to maintain the direction of the fourth industrial revolution,

[1] The Global Innovation Index is compiled by Cornell University, INSEAD business school and the World Intellectual Property Organization. This index contains detailed data on the innovation activity of 126 countries and territories of the world, including 80 parameters of innovative development, including an overview of the political situation, the situation in education, the level of infrastructure and business development.

Table 1. Comparison of results of scientific and technological development of Russia and leading countries by Global Innovation ranking in 2017

Country (rank in the Global Innovation ranking)	Domestic costs of education ,% of GDP	Domestic costs of R&D, % of GDP	Patents received abroad (Patent Cooperation Treaty)	Income from technology exports and payments for technology imports, mln dollars	Researchers per 10,000 employed in the economy, people
Switzerland (1)	5.07	2.97	4115	21086.8/24404.3	55
The UK (5)	5.75	1.71	5282	49174.8/27223.0	84
Sweden (2)	7.72	3.28	3925	20922.8/11547.7	106
Finland (8)	7.16	2.93	1815	10749.9/8005.8	159
The Netherlands (3)	5.61	2.01	4218	39985.8/29427.8	62
The USA (4)	4.94	2.80	81492	113057.0/77286.0	95
Germany (9)	4.94	2.88	18008	61110.3/53079.5	81
Japan (14)	3.77	3.49	42459	29887.2/5197.0	102
China (22)	4.76	2.09	25539	n/a	17
Russia (45)	3.86	1.13	890	688.5/2043.2	65

Sources: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2017.pdf; *Human Development Report 2015. Mobility and Communication Technical notes*; *Scientific indicators: 2015.* Statistics book. Moscow: NIU VShE. Pp. 394, 365.

Table 2. Foreign experience in state programs in Industry 4.0 [14]

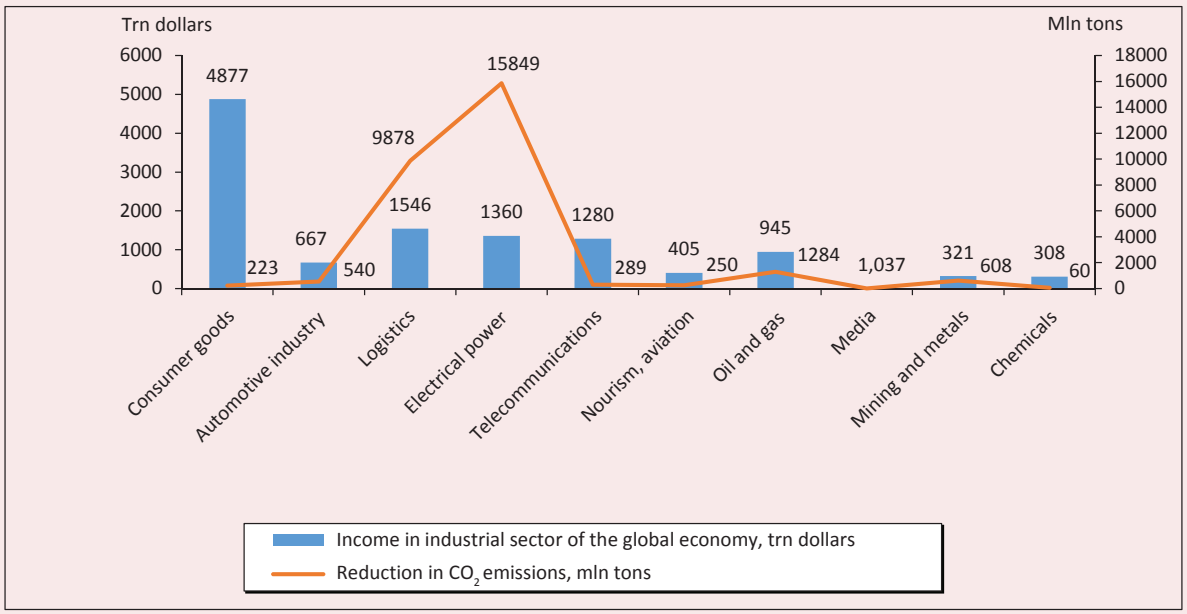
No.	Countries	Features of the program in Industry 4.0.
1.	European Union	In 2010, *the Digital Europe initiative* was adopted, aimed at the development of the Internet economy. The full implementation of this digital agenda will lead to a 5% increase in European GDP, or € 1,500 per capita, through increased investment in ICT, improved skills, creation of opportunities for innovation in the public sector and the reform of the basic conditions for the Internet economy. In April 2016, the European Commission presented the project "Digital market – digitalization of industry: questions and answers".
2.	Germany	In 2011, the *Industry 4.0 strategy* was adopted based on the concepts of the Internet of things and the industrial Internet. According to the forecasts of PwC audit and consulting company, German industrialists will invest 40 billion euros annually in industrial Internet technologies, which will help Germany fully switch to *Internet production* by 2030.
3.	China	In 2015, the concept of *Internet +* was adopted, which included the best initiatives of the world's leading countries: Internet + Manufacturing, Internet + Finance, Internet + Medicine, Internet + Government, Internet + Agriculture.
4.	The USA	In 2009, the *Cloud strategy initiative* was developed, aimed at creating smart industrial production, shops, cities and transport systems, grid technologies in the energy sector, as well as solving the problems of social interaction, e-Commerce, monitoring of supply chains of goods (including global logistics flows).

leading industrial countries are developing an appropriate industrial policy, which is reflected in programs to increase scientific, technological and industrial potential, improve innovation systems, upgrade the technological framework, primarily in manufacturing, as well as the accelerated development of high-tech industries.

At the World Weconomic Forum in 2015, the Digital Transformation Initiative (DTI) was adopted. In 2015–2016, the project focused on six sectors (logistics, media, consumer goods, electricity, automotive industry and healthcare), as well as four cross-themes (digital consumption, Digital Enterprise, social impact and management platforms).

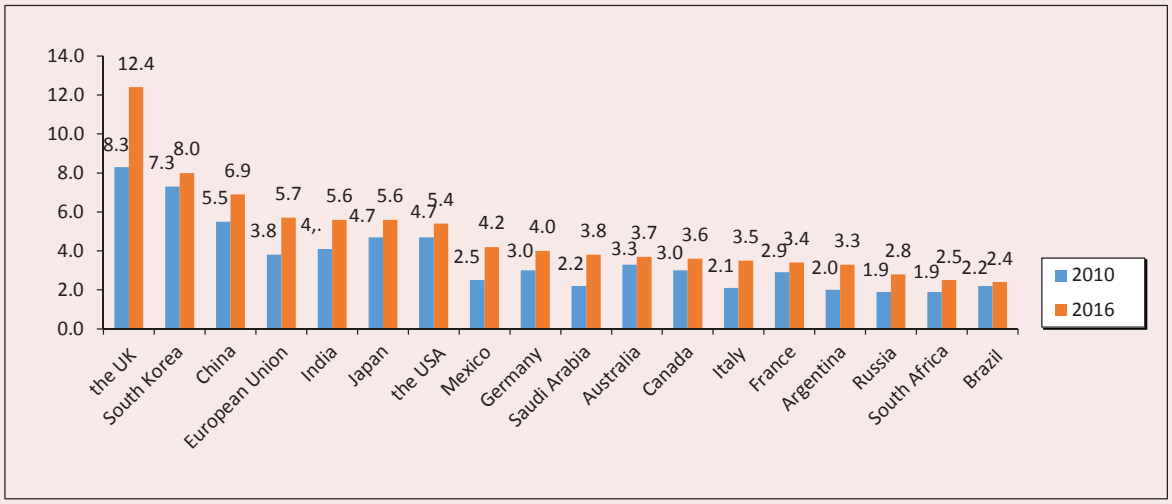
According to the participants of the Forum, industrial and public digitalization over the next decade will bring more than 30 trillion U.S. dollars (*Fig. 3*) [8]. The development of domestic economy is carried out according to a similar scenario typical for most world countries. One of the indicators demonstrating the degree of the socio-economic digitalization

Figure 3. Contribution of industry digitalization to economy



Source: *Analysis of world experience in the development of industry and approaches to digital transformation of industry of the EAEU member-States (information and analytical report of the Eurasian Economic Commission)*. Available at: http://www.eurasiancommission.org/ru/act/prom_i_ agroprom/dep_prom/SiteAssets/Forms/AllItems.aspx

Figure 4. Share of digital economy in GDP in G20 countries*



* The contribution of digital economy to the country's economy is measured by digital GDP. Quantifying the size of digital economy is difficult due to differences in approaches to measuring it. Thus, according to BCG, the level of digitalization of the country's economy is calculated through the e-Intensity index as a weighted average of three sub-indices: infrastructure development, online spending, user activity. The infrastructure development sub-index shows the degree of infrastructure development and the availability and quality of Internet access (both fixed and mobile). The Online spending sub-index includes spending on online retail and advertising. The User Activity sub-index is calculated as the weighted average of sub-indices of a lower level: companies; activity, consumer activity and activity of public institutions. All sub-indices are formed from weighted average of values from the underlying multiple parameters.

Source: *Russia online? Catch up can not be left behind: report*. The Boston Consulting Group. June, 2016.

in the country is the share of digital economy in GDP. According to Boston Consulting group (BCG) international analytical agency, in recent years world's developed countries have demonstrated a significant increase in the share of digital economy in GDP (*Fig. 4*).

The largest share of digital economy in GDP among G20 countries is in the UK, which during 2010–2016 increased the value of this indicator to 12.5%. In Russia, the share of digital economy in GDP in 2016 was almost 3%, and it increased by 0.9% over the period. However, the increase in this indicator is associated with the interest of large Russian companies in new information and digital technologies. Analysis of Internet resources and official websites of enterprises operating in different sectors of the Russian economy shows that large business is focused mainly on production management information systems (SAP-, EAM-, ERP-systems), on the transformation of the business model based on digital technologies. Nevertheless, in terms of the share of digital economy in GDP, Russia continues to lag behind the leaders of digitalization 3–4 times [17].

According to the study, innovation stagnation characteristic of the Russian economy is manifested in the fact that mass redistribution of resources in favor of progressive technological structures has not yet occurred. A steady technological lag in the industrial sector has been established. Backward production for objective reasons cannot demand high-level innovations, so they do not appear [12]. At the same time, the 3rd and 4th technological modes prevailing in the Russian industry have reached the limits of economic growth accompanied by a drop in profitability in traditional production.

This situation is confirmed by statistics on the indicators of growth in the physical volume of GRP, return on assets, return on sales and value of volume of innovative goods, works and services calculated as a whole in Russia (*Tab. 3*).

The performance of GRP growth and profitability of organizations indicates a downward trend in indicators for the period under review. According to official statistics, the share of innovative goods in the total volume of shipped goods has not exceeded 10% over the past decades on a national scale, while in the regional context there is a significant spread in the value of the indicator (from 0.1 to 28.4%).

In developed economies, the main motive for launching a new industrial and technological policy aimed at stimulating the transition to the fourth industrial revolution was the need to overcome the slowdown in productivity growth.

Russia has not yet been able to achieve stable growth in labor productivity: this is particularly clear in recent years, where periods of productivity growth and periods of decline in this indicator took turns (*Tab. 4*).

Thus, Russia faces a difficult challenge: it is necessary to ensure a steady increase in labor productivity and at the same time – to reach its maximum growth rates to fully realize the potential of the national economy.

Table 3. Performance of GRP indicators, profitability of organizations in Russia as a whole for 2000–2016

Indicator	2000	2005	2010	2012	2014	2015	2016
GRP index, increase, %	10.6	7.6	4.6	3.1	1.3	-0.6	0.8
Return on assets, %	7.6	8.8	6.7	6.1	2.5	3.9	4.9
Return on sales, %	18.9	13.5	10	8.6	7.3	8.1	8.7
Volume of innovative goods, works and services, %	4.4	5.0	4.8	8	8.7	7.9	8.4
Source: *Russia in figures. 2017: statistics book*. Rosstat. Moscow, 2017. 511 p.							

Table 4. Performance of labor productivity across countries (GDP output for PPP per employed, U.S. dollars)

Country	Year								
	2000	2005	2010	2011	2012	2013	2014	2015	2015 to 2000,%
The USA	41	52	62	63	64	65	66	67	203.0
France	40	48	58	60	61	63	64	65	203.1
Germany	38	48	57	59	61	63	64	65	203.1
The UK	36	45	47	48	48	49	50	52	179.3
Japan	27	34	37	38	41	42	41	42	190.9
Russia	8	13	23	24	25	24	26	25	by 3.5 times

Source: *New technological revolution: challenges and opportunities for Russia: expert-analytical report*. Moscow, 2017. 136 p.

One of the main conditions for increasing productivity is the technological modernization of production, including the improvement of the existing equipment, as well as putting into operation new equipment, introduction of complex automation, etc.

This conclusion is confirmed by the results of a study conducted in February 2017 by the Center for Strategic Development together with the Ministry of Industry and Trade of Russia, Center for Industry Development, and Agency for Technological Development: almost 84% of the surveyed leaders of Russian industrial enterprises consider increasing the technological level the key to increasing labor productivity.

At the system level, technological modernization should be reflected in increased capital investment, which is not currently observed in Russia (*Fig. 5*): according to Rosstat, the depreciation of fixed assets in manufacturing from increased steadily (46% against 50%, respectively) during 2008–2016.

Russia is currently lagging behind in other key indicators of the new technological revolution. The main issues include the low activity of industrial companies in implementing innovations. Only 8% of enterprises are engaged in development and implementation of innovations in Russia (*Fig. 6*). In European countries, the share of such organizations is much higher: 82% in Germany (2015), 63% in Finland, 60% in France [1].

Another challenge is to reduce the complexity of economic exports, i.e. to reduce the

Figure 5. Degree of depreciation of fixed assets in manufacturing in Russia, % [26]

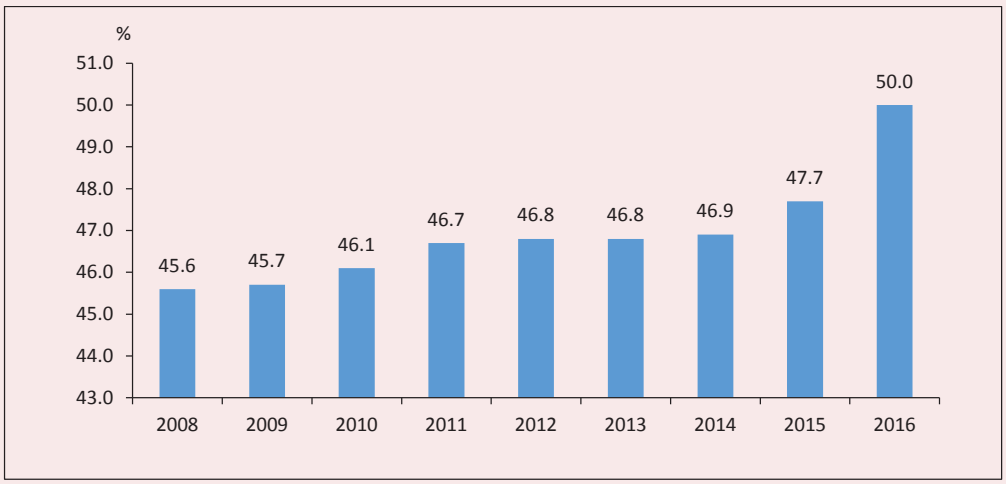
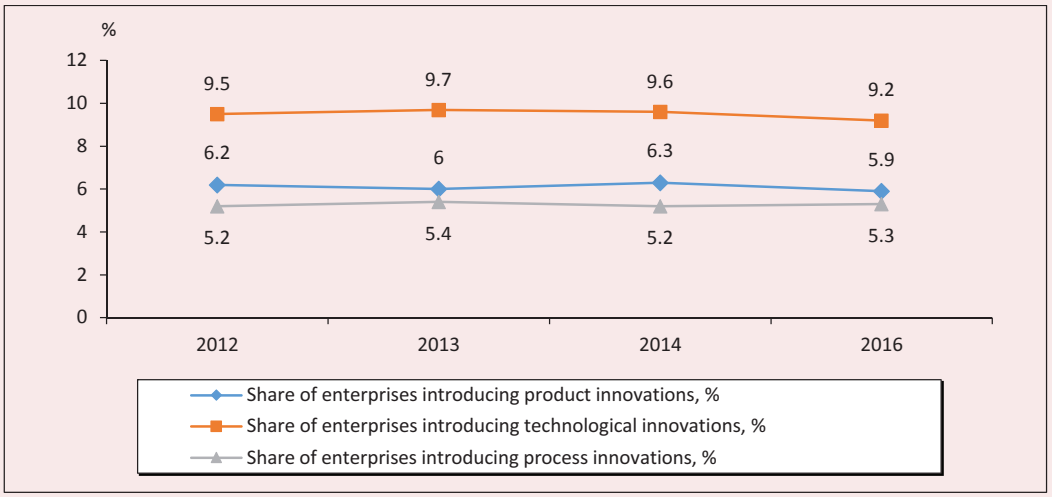


Figure 6. Innovation activity of industrial enterprises in Russia



Source: *Science and innovation*. Moscow: Rosstat. Available at:http://www.gks.EN/wps/wcm /connect/rosstat_main/rosstat/ru/statistics/science_and_innovations/science/#

diversification of the country's products. In recent decades, there has been a shift in the structure of Russian exports towards products of low complexity (82%). At the same time, exports of Russian manufacturing products remain at a relatively low level. As a result, the share of exports of Russian high-tech products in the world is much smaller than that of highly developed countries (*Tab. 5*).

Russia's lag behind the leading countries in the development of advanced technologies underlying the new industrial revolution is also critical. According to Rosstat, at the end of 2016, the amount of developed advanced production technologies amounted to 1,534 units, of which new ones for Russia – 1,342, and fundamentally new ones – 192 units. At the same time, the amount of advanced production technologies used in the whole country was much higher – 232,338 units [1].

Moreover, the gap between Russia and the leading countries of the new technological revolution in the number of registered patents in areas such as robotics, new materials, additive

Table 5. Exports of high-tech products in total exports in Russia and world's countries, %

Country	Year							2016 to 2010,%
	2010	2011	2012	2013	2014	2015	2016	
France	24.9	23.7	25.4	25.9	26.1	26.8	26.7	1.8
China	27.5	25.8	26.3	27.0	25.4	25.6	25.2	-2.3
The UK	21.0	21.4	21.7	21.9	20.6	20.8	21.8	0.8
Austria	11.9	11.7	12.8	13.7	13.9	13.4	17.5	5.6
Germany	15.3	15.0	16.0	16.1	16.0	16.7	16.9	1.6
Hungary	24.1	22.7	18.1	16.3	13.7	–	14.0	-10.1
Russia	9.1	8.0	8.4	10.0	11.5	13.8	10.7	1.6
Finland	10.9	9.3	8.5	7.2	7.9	8.7	8.4	-2.5
Spain	6.4	6.5	7.0	7.7	7.0	7.1	7.0	0.6
Source: compiled using data from the World Bank. Available at: https://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS								

technologies, industrial Internet of things, etc. remains significant. The gap is measured in times, which affects the development of relevant new markets. Thus, according to the All-Russian Scientific Research Institute of Aviation Materials, the share of Russia in the world market of additive technologies in 2016 amounted to about 1.7%. In general, about 1.10% of GDP (2015) is spent annually on R&D in the country. This figure is quite different from the indicators of the leading countries of the technological revolution (3–4% of GDP). Russia also lags behind in other key indicators of the new technological revolution: for example, in 2015, the volume of high-tech exports in China was $554.3 bln, in Germany – $185.6; in the USA – $153.5; in South Korea – $126.5, and in Russia – only $9.7 billion dollars. Russia lags behind the leading countries 5–6 times in the share of organizations engaged in technological innovations. In the international ranking of information and communication infrastructure development (Networked Readiness Index, 2016/2017) our country ranks only 41st [1].

Thus, the main problems are the low level of activity of industrial enterprises in the implementation of innovation, the reducing diversification of products produced in the country, Russia's lagging behind the leading countries in terms of development of advanced technologies and low rates of economy digitalization and platformization.

In general, the comparative analysis of the values of main indicators of the new technological revolution is presented in *Table 6*.

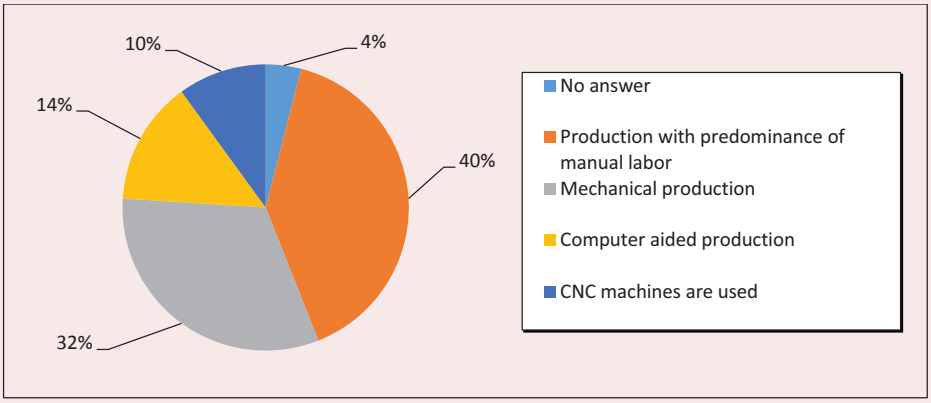
In order to assess the enterprises' readiness for the development of industry based on digital

Table 6. Comparative analysis of Russia's position on certain indicators of new technological revolution [43]

No.	Indicator	Russia	Leading countries
1.	Number of platform companies (2015)	3	China – 64, the USA – 63, the UK –9
2.	Volume of high-tech exports, billion U.S. dollars (2015)	9.7	China – 554,3, Germany –185.6, the USA –153.5, South Korea – 126.5
3.	Labor efficiency, U.S. dollars per person-hour (2015)	25.9	Average labor productivity by OECD countries – 50.8, including in: the USA – 68.3; France– 67.6; Germany –66,6
4.	Share of organizations carrying out technological innovations, % (2014)	8.8	Germany – 55, Sweden– 45.2, Finland–44.6, the Netherlands – 44.5
5.	Share of high-speed broadband network subscribers in the total number of fixed broadband network subscribers (2015), %	58	South Korea – 100, Israel – 97, the UK – 87, Australia – 72, the USA – 67
6.	Share of Internet sales in total retail sales (2015), %	4	The USA – 20, the UK – 20, France –15, Spain – 15, Italy – 9
7.	Costs of R&D (2015), % of GDP	1.10	South Korea – 4.23%, Germany – 2.93%, the USA – 2.79%, China – 2.07%, the UK – 1.70%
8.	Number of patents granted (applicant's country of origin) (2015), units	24 998	China – 279,501; the USA – 257,108; South Korea –109,107; Germany – 86,849; the UK –21,503
9.	Rank in the Global Innovation Development Index (2017)	45	Switzerland – 1; Sweden – 2; the Neterlands –3; the USA – 4; Germany – 9; South Korea –11; Japan – 14; China – 22
10.	Rank in the Global Manufacturing Competitiveness Index (2016)	32	China –1; the USA – 2; Germany –3; Japan –4; South Korea – 5; the UK – 6
11.	Rank in the Networked Readiness Index, 2016/2017)	41	Singapore – 1; Finland – 2; Sweden – 3; Norway – 4; the USA – 5; the UK – 8; Japan – 10; Germany – 15; China – 59

Sources: 1. *Global Platform Survey*, The Center for Global Enterprise, 2015; 2. World Bank; 3. OECD; 4. Rosstat, Eurostat; 5. International Digital Economy and Society Index (I-DESI) 2016; 6. RVC, NIU VShE, I-DESI 2016; 7. EOCD; 8. WIPO; 9. Global Innovation Index (GII) 2016; 10. Deloitte Global Manufacturing Competitiveness Index 2016; 11. WEF.

Figure 7. Distribution of respondents' answers to question "How can you characterize production according to the proposed list of criteria?", % of respondents



Source: survey data on readiness of enterprises in the Vologda Oblast to develop industries based on digital technologies. Vologda Research Center of RAS, 2018.

Table 7. Distribution of respondents' answers to question "How do you assess the use of digital technologies at your enterprise?", % of respondents

Option	%
Studying the possibilities of how this can be used	40.0
Do not use (never considered such a possibility)	36.0
No answer	0.0
Just started using	12.0
Several projects have been implemented	6.0
Planning to use (we have studied various possibilities and are preparing a pilot project)	6.0
Source: survey data on the readiness of enterprises in the Vologda Oblast to develop industry based on digital technologies. Vologda Research Center of RAS, 2018.	

technologies, the Vologda Research Center of RAS conducted a survey among heads of leading industrial enterprises of the region[2].

The monitoring results demonstrate that the majority of enterprises in the Vologda Oblast are dominated by manual labor production (40%), about 32% of respondents said that their enterprise is fully mechanical. However, only 14% of enterprises in the region have computer aided production, and 10% of enterprises use CNC machines (*Fig. 7*).

According to the survey, 36% of industrial enterprises do not use digital technologies in the production process (*Tab. 7*). Only 6% of surveyed enterprises have implemented several projects in digitalization, 6% are preparing a project, and 40% are studying the possibilities of using digital technologies.

In general, industrial enterprises in the region (54%) do not have plans to develop and implement digital technologies, 22% of respondents say that they do not see the need for them. In most cases, enterprises in the region use IOT technologies. The main barrier that complicates the use of digital technologies is the high cost of digital projects (54%); about 40% of respondents note lack of qualified personnel; 26% – draw attention to insufficient experience

[2] The sample totaled 50 industrial enterprises of the Vologda Oblast. The sampling error was no more than 5%.

in using digital technologies.

Amid unfavorable geopolitical situation, toughened competition, extremely low rates of economic growth, Russia faces the issue of increasing economic power through activating the technological factor. The consequence of delaying the transition to a new development model will be the country's further lag in terms of productivity and, thus, competitiveness. There is no doubt that Russia should develop within the framework of the global trend – new industrialization [18].

However, current trends are not optimistic. The competitiveness of most of Russia's production facilities remains low. This is largely due to insufficient funding: the gap between the real need for financial resources to re-equip the backward material and technological production basis is growing, it is estimated at 30–50% (2011–2015) [19].

The current situation requires increased investment in those types of activities that determine the transition to a new technological mode. Ultimately, it is investment that must become the source of a new level of economic development. However, despite the growing federal budget spending on high-tech science-intensive production, such investment has almost did not help modernize and create innovative reserves for the future due to dispersion of funds, high costs of the costly Russian economy, miscalculations in the structural policy.

Analysts estimate the degree of Russia's technological readiness for innovation at the level of 57th position in the ranking[3], which is only thanks to active access to the Internet [20]. The backward material base at the level of III–IV mode interferes with modern technology. According to some estimates, the share of VI mode technologies in Russia is close to zero, V – about 10% only in the knowledge-intensive sector (aerospace and defense industry); more than 50% of technologies belong to the IV mode; 30% – to the III mode, while in developed countries the technological structure of economy is fundamentally different. For example, in the USA – VI mode comprises about 5% of productive forces, V – 60%, IV – 20%, III – 15% [21].

Russia also lags far behind in mastering the achievements of modern scientific and technological progress. This conclusion is based on the country's low share in the world's high-tech markets, which is estimated at 0.3–0.5%, a high degree of dependence of industrial production on imports, reaching 80–90% in some economic sectors [22]. The backward technological basis makes it impossible to increase labor efficiency and reach high rates of industrial growth, as well as to compete successfully in the world markets. As a result, over the years of market transformations, the Russian industrial sector has seriously decreased, while the process of deindustrialization was most critical in technology-intensive industries.

From this layout it becomes clear that the issue of transferring the industry to the platform of digital technologies is becoming important for the Russian economy.

Proposals. Thus, despite the high potential for technological transition in various economic sectors, especially in terms of digitalization of economic and social processes, the negative performance demonstrated by the Russian economy does not ensure effective joining to global trends set by the new technological revolution.

The development of Russian production in the context of transition to the digital economy

[3] *The Global Competitiveness Report 2017–2018*. Geneva: World Economic Forum. 2017. P. 249.

in the near future will require to address issues related to productive inclusion in the new technological revolution in order to implement a structural step in the economy, radical technological modernization of traditional sectors of the Russian economy, support for suppliers of technological solutions for the industrial sector, training for a qualitatively new industry and facilitating the transition to a new organization of business processes at industrial enterprises. The implementation of this course coincides with the general global trend – new industrialization, which determines the main content of the industrial policy of world's developed countries. Given the current structure of the Russian economy, the current level of development of the national innovation system, we can conclude that the country's transition to a qualitatively new economic, industrial and technological paradigm will depend on coordinated implementation of measures in a number of areas [23].

It is impossible to achieve progress in addressing this issue without the development and implementation of an appropriate state industrial policy. It should ensure the formation of balanced proportions in the economy through the development and implementation of a set of measures of state regulation at the macro-, meso- and micro-level. These measures should be aimed at restructuring and large-scale technological modernization of the economy, presented in the form of step-by-step objectives, based on global trends and internal features of economic management.

The most important objective of the state industrial policy is to determine priorities in forming a promising industrial structure of the national economic complex, capable of generating new growth sources. The choice of structural priorities is important as it will form the basic requirements for the quantity and quality of the necessary resources for their development – labor, technology, investment, as well as requirements for the institutional environment.

The choice of structural priorities should be preceded by a thorough inventory of the industrial complex with a number of factors taken into account: promising commodity markets for national producers, potential, the growing competitiveness of various industrial sectors, provision with strategic goods, the social importance of certain sectors of industry, the available scientific and technological reserves, etc.

Having a fairly capacious market and claiming to be one of the subjects of the global economy, Russia cannot specialize in a narrow range of industries and technologies, especially in the context of the worsening geopolitical situation. Russia can only maintain its subjectivity by forming a diversified, technologically independent and competitive economy focused on the development of industries of different technological modes that address different problems. The industries of a future wave should guarantee independence and self-sufficiency in the future, the industries of the current wave provide basic infrastructure and technological support to the economy, while old industries are the main source of employment.

In this context, two groups of structural priorities should be formed within the framework of industrial policy. The first group should be focused on advanced development of industrial potential, ensuring Russia's competitiveness in fundamentally new technological areas. Today, Russia has the opportunity to integrate into global value added chains in shipbuilding, nuclear power, aerospace, ICT. However, it is necessary that centers of profit and system integration

gradually moved to the territory of Russia. And this requires close attention to the new technologies of Industry 4.0, opening up new opportunities for the development of the industrial sector and forming new promising markets. Thus, the potential effect of using mobile Internet by 2025 may be close to 10 trillion dollars; of automation of mental labor – more than 6 trillion dollars; of robotics – more than 4 trillion dollars [24].

The second group of priorities should ensure large-scale technological modernization of the most important economic sectors – their re-equipment and dynamic development, overcoming technological backwardness and import dependence on foreign manufacturers of equipment, including by building their reproduction chains.

It is particularly relevant to link the structural priorities of industrial policy with the main directions of the scientific and technological policy, to implement which it is necessary to form a technological vector of development of the Russian economy based on visualizing the future of the country, its promising sectoral structure, the technological state of the main economic sectors, and the objectives of the socio-economic development.

Such a vector should be based on a long-term qualitative forecast of scientific and technological development and disclosed in the framework of key objectives of the strategy of scientific and technological development, followed by the development of specific programs and projects. The scientific and technological priorities specified in the Strategy should outline the directions of structural and technological modernization, whose practical implementation will form the core of industrial production based on new promising technologies.

In 2017, the country developed and adopted the program "Digital economy" (which in 2019 was transformed into the national project "Digital economy"), in which the main emphasis is put on addressing the problems of information technology development and the creation of digital platforms. At the same time, the problems of "industry digitalization" and introduction of advanced production technologies remained almost out of the developers' sight.

Thus, within the framework of Russia's transition to a new development model, the formation of its strategic technological vector should become an integral part of domestic industrial policy. In fact, the principle of unity of science, technology, innovation and industrial policy should be adopted, on the basis of which the developed countries are achieving success in addressing the problems of new industrialization, in improving the global competitiveness of national economies.

Conclusion. To develop the Russian industrial complex it is required in the near future to address issues related to country's productive inclusion in the new technological revolution in order to take a structural step in the economy; to radical technological modernization of traditional sectors of the Russian economy; support for suppliers of technological solutions for the industrial sector and transition to a new organization of business processes at industrial enterprises. The implementation of this course coincides with the general global trend – new industrialization, which determines the main content of the industrial policy in developed countries. Given the current structure of the Russian economy and the current level of development of the national innovation system, we can conclude that the country's transition to a qualitatively new economic, industrial and technological paradigm will depend on coordinated implementation of measures in a number of areas. These include the technological

modernization of traditional sectors of the Russian economy, the development of new high-tech sectors and ensuring the country's entry into new markets, the restart of the R&D management system, the reorganization of development institutions, as well as the end-to-end "digitalization" of the real economy.

The research novelty of the study lies in the development of methodological approaches to detecting innovative transformations of Russia's industrial sector in the context of the fourth industrial revolution and economic development, focused on the introduction of digital technologies in production, serving as a technological basis for the economic growth of the Russian economy. The research results can be used for analytical, predictive studies of regional and national macro-systems performance, for developing recommendations for creating prerequisites for economic growth amid the transition to a new technological revolution. This will improve the quality of economic policy.

In our opinion, further stages of the research should be: 1) assessing the innovative development of the Russian economy amid global competition and formation of high-tech science-intensive production; 2) identifying directions of organizational and technological transformations in the Russian economy amid global competition and development of digital economy; 3) developing the mechanism of state regulation of innovative development of the regional economy based on the transition to digital economy.

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Social Vulnerability of Families with Children in Modern Russia*

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Abstract. When performing its reproductive function, the family – the main institution for population reproduction – continues to bear increased risks of poverty. The goal of our paper is to study manifestations of social vulnerability of modern Russian families with children. Despite the active demographic policy implemented with the help of national projects since 2006, the actual situation concerning families with children has not undergone any significant changes. The birth of a child continues to reduce the standard of living to the point of crossing the poverty line; the housing market remains inaccessible, and the tools for combining parenthood and professional activities do not work. The resources of an average family do not promote the formation of human potential of the child population that would meet the demands of the knowledge economy and are reduced to a set of primary needs. The existing mechanisms of social support do not guarantee that the life of families with children will actually improve; childcare allowances

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are not growing and are not focused on achieving any standard of living, even the minimum subsistence level. Having few children becomes a conscious choice against the background of the crisis of marriage, which ceased to serve as a kind of contract according to which the husband is a breadwinner, and the wife gives birth to children and runs the house. Women have become full-fledged actors in the labor market. However, they still face discrimination in this regard. The analysis of gender statistics shows that women who have the same level of education, sphere of activity and official status as men receive an average wage that is one third lower compared to that of men. However, the phenomenon of working wives is not only and not so much a reflection of their desire for professional self-realization. Two working adults in an average family will provide a per capita income at the subsistence level in case they have no more than two children. In addition, satisfaction with the availability and quality of education and health services – the institutions that support the reproduction of the population and human potential – remains far from the desired level. Under the circumstances, the family with children remains one of the most socially vulnerable population groups; this fact requires the revision of the mechanisms of social policy and the principles of the social state in general. Scientific novelty of our study consists in the fact that it analyzes and classifies the manifestations of social vulnerability of modern families with children and puts forward the proposals to improve the social and demographic policy of the state. The findings of our research can be used in the practice of public administration.

Key words: family, children, state support measures, financial problems, housing problems, social services, reproductive potential, social policy.

Introduction

Modern Russian society, which is completing its demographic transition with an unusual combination of low birth rate and high mortality, is interested in a stable and healthy family, because a two-parent family, performing socially important functions, is the main condition for population reproduction (more than 70% of children are born in wedlock) [1, 2, 3, 4]. Having evolved from a production team to a free union based on love, the family is less and less associated with joint domestic life, bearing and upbringing children, leisure activities, interacting with relatives, and most importantly, primary control and responsibility for its members [5]. In the period of atomization of society [6, 7] the family, on the one hand, is the most important institution for people, and on the other hand – it is the problems and responsibilities that can be avoided. Therefore, divorce rate is high, as well as cohabitation. The situation of families, especially the economic situation, is changing markedly with the birth of children, so they represent one of the main objects of social assistance provided by the state. Thus, studying and systematizing the problems of modern families with children and searching for effective ways to solve them are among urgent topics.

The goal of our paper is to study manifestations of social vulnerability faced by modern Russian families with children. Under social vulnerability we understand a situation where an individual or a group has limited access to material and intangible resources and/or is at risk of social exclusion in the near future in case of the absence of support from the state and society [8]. To achieve the goal, we address the following tasks: we study the existing measures and forms of support for families with children, we analyze and classify problems

of modern families with children, we develop possible ways to solve the existing problems and improve the social and demographic policy of the state. We analyze manifestations of social vulnerability of families with children on the example of the Russian Federation and the Vologda Oblast, as a region whose trends in demographic and socio-economic development are similar to the national average [9]. Scientific novelty of our research consists in the fact that we analyze and classify manifestations of social vulnerability of modern families with children and develop proposals to improve the social and demographic policy of the state.

Materials and methods

We use a set of scientific methods, in particular, comparative analysis, statistical analysis and sociological methods to achieve the goals and objectives. Theoretical basis of the research includes scientific works of leading demographers, economists, sociologists on the transformation of the institution of family and marriage, on the measures to support families with children, on demographic policy and the life cycle of families with children.

The information base of the study includes the data of official statistics and sample observations of the Federal State Statistics Service (Rosstat): Comprehensive observation of living conditions of the population in 2011, 2014, 2016, 2018; Sample observation of incomes of the population and participation in social programs in 2017; Sample observation of reproductive plans of the population in 2012 and 2017, the data of the Territorial Office of the Federal State Statistics Service in the Vologda Oblast (Vologdastat). In addition, we use the findings of representative sociological surveys conducted by Vologda Research Center of the Russian Academy of Sciences in the Vologda Oblast and the Northwestern Federal District: the monitoring of reproductive potential[1], the monitoring study "The study of conditions for the formation of a healthy generation" in 2017[2] ; the survey "Socio-cultural modernization of regions – 2017"[3].

Results

Measures and forms of support for families with children are part of the social policy of the state, in particular, its demographic and family policy. Throughout their existence, they have changed along with the transformation of the institution of the family and the state social policy. Among the main turning points, experts point out the October Revolution, after which the pressure on families decreased, divorce procedures were simplified, registration of marriages ceased to be mandatory, and a woman was given the right to decide on the performance of her reproductive function (legalization of abortions). However, since the mid-1930s the situation changed, Stalin's conservatism was looking for support in

[1] The monitoring, which is a quantitative sociological survey, was conducted in 2005, 2008, 2011, 2014, and 2017 in the Vologda Oblast by Vologda Research Center of RAS, the sample volume in each year of the monitoring was 1,500 inhabitants of reproductive age (15–49 years old) from the cities of Vologda and Cherepovets and eight municipal districts of the Oblast; territorial, gender and age-specific sample quota was used; sampling error does not exceed 3%. The method of collecting information is a questionnaire; the information was analyzed with the help of SPSS Statistics.

[2] The study is a cohort monitoring conducted in 2017 on the territory of the Vologda Oblast by Vologda Research Center of RAS, the sample consists of families with children born in a certain year and aged from 0 to 18, the multistage and quota sample is based on territorial and age characteristics; sample size is 298 families, sampling error does not exceed 5%. The method of collecting information is a survey of parents, children aged 10 and older, and healthcare workers. The information was analyzed with the help of SPSS Statistics.

[3] The sociological survey of the adult population "Socio-cultural modernization of regions" was conducted in 2017 by Vologda Research Center of RAS in the Vologda, Murmansk, Kaliningrad and Novgorod oblasts and in the Republic of Karelia. The sample quota by sex and age was used, the volume is 3,108 people, sampling error does not exceed 5%. The method of collecting information is a questionnaire, the information was analyzed with the help of SPSS Statistics.

traditional values, abortions were banned, and a number of legal acts aimed at strengthening the family and marriage were adopted; benefits for large families and single mothers were introduced for the first time [10]. Funds for these measures were sought by redistributing income in favor of families with children through the introduction of the so-called "tax on childlessness" [11]. However, with the predominance of an extensive type of production, which required a constant influx of workers, including women and older people, the family became increasingly focused on having few children, and the state created a system of childcare, partially taking over this function and reducing the role of grandmothers in the upbringing of and caring for the younger generation. In parallel, the institutions that replaced the family in the performance of a number of other functions (health, culture, law enforcement, etc.) were being developed [12]. After a sharp decline in birth rate in the 1960s, a revolutionary package of measures to support families with children ("maternity" leave, childcare allowances) was adopted, which by 1980 led to a noticeable surge in the birth rate [13].

A new wave of activation of demographic policy began in 2006. The introduced support measures, especially the resonant "maternity capital", according to experts, significantly influenced the real changes in birth rate [14]. However, the net coefficient did not reach one, and after 2016 both the crude birth rate and the total fertility rate ceased to grow. Within the framework of the demographic transition concept, the equalization of birth and death rate and achieving the stationary population are substantiated by evolution [15, 16]. However, death rate in Russia remains high and it can lead to further depopulation and aggravate population ageing; these issues urge the government to focus its demographic and social policy on stimulating the birth rate by supporting families with children.

Currently, a system of measures to support families with children has been established; it is aimed primarily at promoting the birth rate. At the same time, the policy of "poverty alleviation" and the task of creating a society of equal opportunities of the social state have also chosen the family with children as one of the objects for support, but only if the family meets certain criteria, namely, the average per capita income of the family should not exceed the subsistence level. The measures are differentiated according to the stage of the family's life cycle: for families where a child is on the way and for families with one, two and three or more children (large families). Some of the measures are guaranteed at the federal level, others depend on regional financial capabilities; in addition, a number of benefits and payments depend on the demographic situation in the region[4]. Benefits are differentiated by the status of the recipient (those subject to compulsory social insurance in connection with motherhood – working under an employment contract; the unemployed; full-time students; those who serve in the army under the contract), and by the financial position of recipients (the majority of benefits and compensations are paid to low-income families). The most common forms of support for families with children are as follows: one-time and monthly payments; compensation for transport costs, parental fees for kindergarten, the insurance part of the pension, the cost of utilities; provision of free-of-charge medical care and food; free access to social and cultural services; partial payment of

[4] Social support for families with children: some important facts for six years. *Official Website of the Russian Government*. Available at: http://government.ru/info/32115/

social services; provision of land ownership; tax deductions [17].

Separate support measures are provided for the families with disabled children, foster families, families of servicemen, and families who lost a breadwinner. Despite such a wide range of forms and measures of support for these families with children, the question of the adequacy of social assistance to solve their problems remains open.

Problems of families with children

If we consider the experience of modern researchers and review the existing forms of support for families with children in Russia, we can say that modern families with children have to deal with financial, housing and social issues. No doubt, they are in some cases interrelated and interdependent, but the degree of their importance for the development of the modern family allows us to consider them separately.

According to subjective estimates, material and housing conditions are among the major factors that hinder the increase in the birth rate in Russia. These factors have remained acute for a long time *(Tab. 1)*. In recent years, there has been a significant increase in the importance of such factors as "risk of losing a job" (by 20 p.p.), "unstable economic situation" (by 8 p.p.) and "career priority, the desire "to live for myself" (by 8 p.p.).

If the first two reasons proceed from the objective economic situation in the country and the specifics of the existing institutional environment (in particular, the difficulties that women face when combining reproductive and labor activities), the third one stems from the value transformations expressed in the desire to satisfy personal needs and maintain successful competition between "family-oriented", professional and creative life goals.

The reasons for postponing or abandoning the birth of children are related to fact that parents expect a *deterioration of the financial situation* of the family after the child is born. In modern Russian conditions, families with children face greater risk of falling below the poverty line. "With each subsequent child, the family plunges into deeper poverty: the relative poverty of a full nuclear family with one child is 42%; a full nuclear family with two children – 48%; a full nuclear family with three children – 55%" [18]. Thus, according to sample surveys of Rosstat, among households with children under the age of three, 35% were among the

Table 1. Distribution of answers to the question "In your opinion, what impedes the increase in the birth rate in our country?" (percentage of respondents)

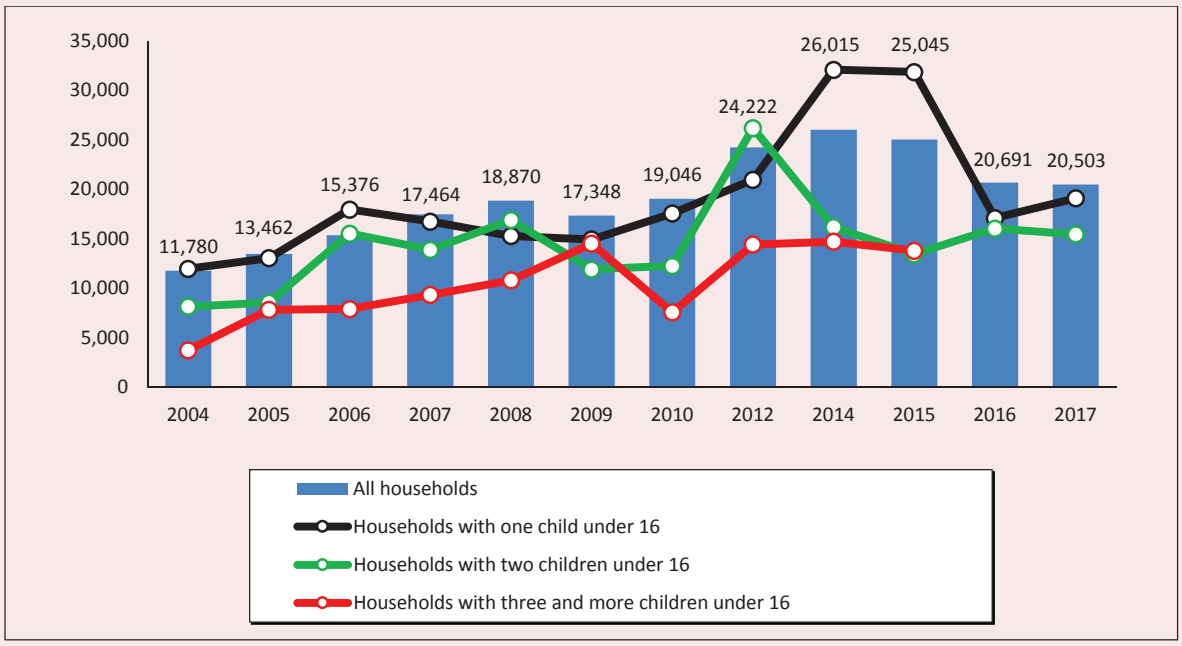
Answer	Survey year					2017 to 2005, +/-
	2005	2008	2011	2014	2017	
Poor housing and material conditions of most families	68.3	80.4	70.0	70.7	66.6	-1.7
Unstable economic situation	43.5	51.8	45.8	46.3	51.9	+8.4
Uncertainty about the future*	н/д	50.7	47.1	38.8	46.3	-
Risk of losing a job	15.5	36.1	30.5	33.7	36.3	+20.8
Career priority, the desire "to live for myself"	8.3	27.1	13.6	16.1	16.3	+8.0
Birth of a disabled child	12.5	23.5	13.4	13.3	11.9	-0.6
Childcare routine	12.2	25.8	15.1	12.7	11.9	-0.3
Socially accepted norms (the fashion for small families)**	no data	no data	4.1	4.2	3.0	-
Other	0.6	1.3	0.5	0.4	0.2	-0.4

*For the first time included in the answers in 2008.
** For the first time included in the answers in 2011.
Source: Monitoring of reproductive potential. VolRC RAS.

Table 2. Key indicators of income differentiation and poverty in Russia, 2016

Indicator	All houdeholds	Among them – households with children under 18			Households with children under 3
		1 child	2 children	3 and more children	
Per capita average cash income, % of the subsistence level	261.5	229.2	175.0	118.0	153.0
Proportion of the poor, %	13.1	12.2	26.3	51.0	35.2
Cash income of the poor					
average per capita per month, rubles	6 945	7 335	7 159	6 275	6 842
% to the subsistence level	69.2	72.9	71.0	63.0	67.9
Cash income deficit					
average per capita per month, rubles	3 085	2 729	2 930	3 683	3 236
% to the subsistence level	1.5	1.4	4.2	15.7	7.2
Source: Selective monitoring of people's income and participation in social programs. Rosstat. 2017.					

Figure 1. Cash income of households of the Vologda Oblast, on average per 100 households, rubles*



Note. Since 2016, Vologdastat distinguishes between two groups of households: with one child and with two or more children.

* In comparable prices of 2017.

Source: Statistical Yearbook. Vologdastat. 2017.

poor, that is, the average per capita income was below the subsistence level. One in two households with three or more children was characterized as poor, and the income deficit was more than 3,500 rubles for each family member *(Tab. 2)*.

The dynamics of per capita income of households with children in the Vologda Oblast shows similar trends: with each subsequent child, the level of income in the family decreases and approaches the average per capita subsistence minimum *(Fig. 1)*.

Cash income of families with many children is significantly lower than that of all households in the region. In addition, families with two or more children are more sensitive to the manifestations of economic crises; this was reflected in the downward dynamics of their incomes in 2009–2010 and in 2011–2013.

According to researchers, families with one or two children, that is, the most common families in Russia, along with citizens of working age living alone and families without children, fall into the category of the "new"[5] poor and make up about 50% of the total poor population. This means that the increase in poverty was mainly due to new types of families whose heads are of working age [19]. According to the Ministry of Labor, in 2018, 70% of the poor in Russia were families with children. As noted by the Minister of Labor M. Topilin, with the birth of a child/children the income of a family falls[6].

Housing conditions

Housing is an important condition for the implementation of reproductive plans. The acquisition of living space is one of the most significant costs of the family budget of Russians. That is why financial problems are exacerbated by housing problems for those who do not have their own housing as a property or their dwelling place does not meet sanitary requirements. Almost half of families with children in Russia are in need of larger living space, and the greater the number of children, the smaller the size of living space per person *(Tab. 3)*. There are not enough tools available to expand housing; an average family most often has no other option but to use mortgage lending. Despite the widespread use of mortgages, preferential rates, and the possibility of refinancing active loans at a reduced rate of 6% for families with a second and third child, there are still a number of restrictions that do not help solve housing problems to the fullest extent:

– first, preferential rates apply only to the primary market, which may have either unreasonably high prices or a poor quality of construction;

Table 3. Characteristics of housing conditions of households in 2018, %

Indicators	All households	With children	Without children	Young families	Young families with children	Families with many children
Number of households living in all types of accommodation, total	100	100	100	100	100	100
Including the households that indicated that they						
do not feel the lack of living space	77.4	58.5	87.0	64.0	58.8	42.7
feel a certain lack of living space	17.0	29.8	10.5	28.1	29.6	35.0
feel a great lack of space	5.5	11.6	2.4	7.8	11.6	22.3
not defined	0.1	0.1	0.1	0.0	0.0	0.0
Size of living space per household member, m^2	15.75	11.53	20.26	11.22	10.03	9.62
Number of living rooms per household	2.37	2.62	2.24	2.07	2.39	3.01
Source: Sample survey "Comprehensive observation of living conditions of the population". Rosstat. 2018.						

[5] During the Soviet period, such families were not considered as poor.

[6] The Ministry of Labor noted that 70% of poor Russians are families with children. *Gazeta "Izvestia",* 2018, no. 93. Available at: https://iz.ru/748878/2018-05-28/topilin-nazval-semi-s-detmi-bolshinstvom-sredi-zhivushchikh-v-bednosti (accessed 15.01.2018).

– second, the preferential rate covers a small share of those loans that families pay for decades, denying themselves other expenses (currently the preferential rate is active for three years – at the birth of a second child from 2018, for five years – at the birth of a third child, its maximum period is 8 years, if a third child is born during the period of the first subsidy);

– third, under the terms of the program at least 20% of the cost of housing must be paid as a down payment. Therefore, if a family with children does not have savings, inheritance, or cannot attract co-borrowers and other types of assistance, then the acquisition of housing via mortgage is difficult. The already small income of the family should be used to accumulate a down payment.

Maternity capital has proved to be an effective tool for solving the housing problems of families with two or more children. This is especially noticeable in the regions [20]. According to a monitoring survey "Studying the conditions for the formation of a healthy generation", families participating in the program "Maternity capital" in 2017 noted more often that after the birth of a child their living conditions have become better (67%), compared with families who did not participate in this program (only 22.4% of them noted the improvement of living conditions). Consequently, the order of the birth of the child indirectly affects the material possibilities of the family in terms of housing. About 60% of families used maternity capital to solve their housing problem[7].

Social problems of families are characterized by a whole range of manifestations and can be internal and external, can include various socio-psychological aspects (patterns of life cycle, deviations of various kinds, etc.), difficulties in obtaining social services, social integration issues, etc. Taking into account their relevance in modern conditions of development, let us focus on the difficulties that families have to face when obtaining social services, and on those institutional and mental barriers that impede the effective implementation of reproductive function.

The participation of the state as the "customer" of certain reproduction parameters is not limited to financial instruments of direct or indirect support for families with children. An important role is played by the creation and maintenance of institutions that support the family at the birth and upbringing of children, help combine reproductive and labor activities, form social norms concerning the number of children in the family, marriage and partnership, and acceptable life strategies in general.

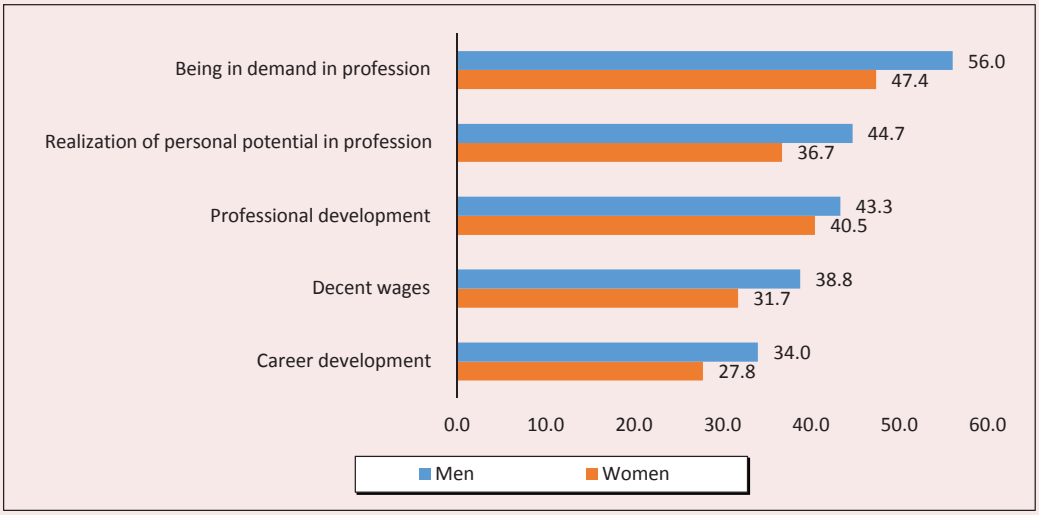
Thus, for example, the socially approved desire to "stand on one's own feet", to achieve success in work and acquire social "maturity" entails the postponement of births, the aging of motherhood and, as a consequence, a decrease in the birth rate and an increase in child morbidity. This is one of the factors leading to depopulation in Russia [21].

The existing contradiction between the work, financial well-being and the birth of a child forces most families to make a choice in favor of childlessness and postpone the birth of a child, taking into account the external situation. According to experts, today's social policy to support the family in Russia is such that it does not allow women to combine work with normal childbirth [3].

First, there still exists gender-based wage discrimination. A survey carried out by Vologdastat shows that under equal conditions

[7] According to the Pension Fund of Russia. Official website of the newspaper "Izvestia". Available at: https://iz.ru/731062/tatiana-gladysheva/rossiiskie-semi-potratili-matkapital-na-ipoteku (accessed 02.02.2019).

Figure 2. Distribution of answers to the question "How do you assess your career prospects?" (percentage of respondents)



Source: "Socio-cultural modernization of regions – 2017" survey, Northwestern Federal District. Conducted by VolRC RAS.

(level of education, type of economic activity, position at work) women have an average wage of one third lower than men [22].

Second, women estimate their own professional prospects significantly lower than men. This is mainly manifested in the issues of demand (47% vs. 56%, *Fig. 2*) and self-realization (37% vs. 45%) in the profession, as well as decent wages (32% vs. 39%). At the same time, women consider their career prospects as least realistic (29%).

Moreover, according to a research conducted by the McKinsey Global Institute, the fight against global gender inequality can lead to an additional increase in global GDP by 11–26% by 2025 [23]. In addition, the removal of institutional barriers concerning women in the labor market may give them more opportunities to implement reproductive plans, be socially protected when taking maternity leave, combine childbearing and employment and thus influence the demographic situation in the country.

The inertia of demographic attitudes led to the fact that, having achieved the right to do "the prestigious work that men do", women began to bear a double burden in family life. Along with men, they now provide material security in the family, and the husband is no longer considered the breadwinner and head of the family. The range of family and marriage responsibilities of women is much wider, and they perform most of them without relying on someone else's help [24]. Thus, the need to prove their professional worth, to be in a constant struggle for the opportunity to implement the social roles of "mother" and "wife" without losing social status, skills and independence, puts modern women in a situation in which they have to make a choice. They either plan maternity and leave their job temporarily (adjust the calendar of births to suit themselves, postpone childbirth, increase or decrease the intervals between successive births), or such planning is associated with the involvement of mother-substitution resources

(grandparents and other relatives, nannies, nurseries, husband, etc.), or they prefer a career and an independent life without planning to expand the family.

The system of pre-school education is the main institution that allows parents to continue working and thus improve their financial situation. Despite the close attention of the federal and regional authorities to the problems that exist in the system (the strategy for development of regions and municipalities is taken into consideration in the "May decrees" of the President), the problem of providing children with places in kindergartens has not yet been solved. The issue is acute in cities as well: for example, in the Vologda Oblast in 2017, the groups were compacted – there were 109 children per 100 places [25]. This creates such a threat as high morbidity in children, and consequently, increases the likelihood of parents taking a sick leave to stay at home with their children [26].

Another important aspect for parents is to ensure the development of children. It is done with the help of school education and additional education. Although the provision of population aged from 5 to 18 with additional education has increased significantly, this figure in 2016 was far from the benchmark set by the President's May decrees (63% against 75%). The reason for this lies both in the deterioration of facilities, equipment and other resources and in the ageing of the staff of children's art centers, hobby groups and clubs, as well as in the weakness of the private sector of providers of such services (a problem that, in particular, should be addressed by the new reform of additional education related to the transition of this sector to per capita financing). In the sphere of school education, the personnel problem remains very acute: in 2004–2016, the number of teachers in secondary schools of the Russian Federation decreased by more than 20%. In this regard, as well as due to the increase in the number of children in recent years, the number of students per teacher has increased significantly (by 18% nationwide – from 12.0 to 14.2 students; by 27% in the Vologda Oblast – from 11.4 to 14.5 students) [27].

As for medical care, according to the results of sociological surveys in the Vologda Oblast, the majority of parents are more or less satisfied with the medical care their children receive, but a significant part of them indicates the presence of serious problems in medical institutions, such as queues (45%), lack or high cost of medicines (26%), lack of necessary specialists (18%), inability to get an appointment with the doctor (15%), and insufficient equipment of a medical institution (13%).

Discussion

Considering and classifying the problems of families with children in different ways, most researchers point to the lack of effective assistance provided to these families in modern Russian conditions. The residual principle of provision of financial support to childbearing and family continues to prevail [3, 10, 28, 29]. The reasons why families with children are poor include first, a low level of wages, and second, insufficient state support provided to children and unemployed [19]. An important consequence of this is the spread of child poverty, which exceeds the poverty of the adult population and leads to serious problems related to children's health deterioration, underutilization of human potential, reduction of opportunities for their development and education. Researchers note that "in all types of families, the extent of child poverty in Russia is 4–5 times higher than the OECD average, and in Western Europe – 10 times higher"[18]. Reducing child poverty will depend both on

addressing labor market issues such as reducing the prevalence of low-income employment and reducing unemployment and on improving the effectiveness of social programs for targeted support of families with children (benefits, maternity capital, etc.) [30]. The Ministry of Labor believes that the recent increase in the minimum wage and the implementation of the President's "May decrees" will improve the situation concerning the incomes of families.

Public authorities more and more often point out the need to improve the targeting of social payments and other assistance and the need to exclude from the list of recipients of services unscrupulous citizens who hide their real incomes[8]. However, public discussions come to the conclusion about the prevalence of negative consequences from selective social policies, and these consequences surpass the amount the budgets save on social benefits: low efficiency (according to the experience of foreign countries); the need for a strict system of monitoring recipients and officials of social protection; aggravation of disintegration of society; perceiving the recipients of social assistance as socially defective; compression of effective demand, etc.[31, 32, 33, 34]. "While making the transition to social support only for the most needy, Russia is forming the following image of the future society: split, with limited human potential and high social risks" [31].

In recent decades, active work to expand financial support has yielded results, allowing people to implement plans for the birth of a second child, increasing the birth rate [14]. However, any tool has its own limit of effectiveness, and it is no coincidence that researchers come to the conclusion that modern policy aimed to support families with children should be revised. The first signal for its renewal was the awareness of the authorities of the need to stimulate the birth of a first child; this need was expressed in real support measures since 2018. However, focusing on the principle of targeting, the majority of social payments, benefits and compensations were made with a focus on the poor; this fact generally limits the possibilities of full-fledged development of other families, whose incomes slightly exceed the established norms relative to the subsistence minimum, which implies the level of physical survival, but which cannot provide a decent quality of life and promote the development of human potential.

Summary

In conclusion, we should noted that families with children, even despite their number, are a vulnerable category of the Russian population and one of the main recipients of social assistance, as they face a whole range of problems. The birth of children entails a significant reduction in income, in some cases – falling below the poverty line. The consequences of these processes carry the risk of insufficient resources for the development of human potential of children. Modern measures of social support are aimed at ensuring physical survival, addressing housing problems of families, but this does not allow them to get out of the category of "poor". The status of the needy, of those who need assistance contributes to the fact that parenthood is endowed with negative features and is associated with financial and other problems that successfully compete with psychological reproductive motives (the joy of becoming parents).

In addition, the instability of the situation of women with children in the labor market is manifested in the fact that women agree to a demotion at work or to an employment

[8] Social support in Russia should be targeted. *RIA NOVOSTI*. Available at: https://ria.ru/society/20180327/1517365826.html (accessed 15.02.2019).

with less favorable conditions, and to the abandonment of career prospects. Revision of family roles causes women to be competitive and engaged both in family life and in work and contributes to the postponement of births and determination to have few children. Preschool institutions are designed to remove some of the worries of childcare, education and development, but in the context of the relatively numerous generations of those born in the 2000s, there is a situation in which not every child gets a place in the kindergarten. Moreover, in urban kindergartens groups are compacted and parents (usually mothers) are forced to get a sick leave from time to time, thereby further worsening their financial situation and relations with the employer.

Thus, on the one hand, the situation in the families with children makes it necessary for the state to provide them with support; on the other hand, it is the quality of life of families that is an indicator that shows the effectiveness of the policies focused on them. According to the results of our research, we concluded that the existing measures are not enough, since a number of problems remain relevant. There is a need for management decisions that can ensure a decent quality of life for families with children and take them out of the zone of social vulnerability.

Among the individual tools for solving the problems we can identify systemic steps that will help save and promote the institution of the family, establish an institutional structure that will allow women to combine professional development and motherhood and that will create conditions for positive upward mobility and decent wages for women.

In modern realities, experts and analysts appeal to the need to revise the social policy of the Russian Federation. In our opinion, in this case two options are possible: to continue selective policy, but with the revision of criteria according to which the family can be considered "poor", or to make a purposeful transition to the universal type of distribution of privileges. In particular, based on the analysis of the existing problems, the question arises concerning the development of such measures of social support for families with children, which would affect them regardless of income and number of children and which would create conditions for the harmonious development of all family members. Both of these options require substantiation of financial costs, creation of mechanisms for adapting to modern conditions, but without such changes it is impossible to improve the standard of living and quality of life of families with children, improve the quality characteristics of the population, achieve sustainable trends in the growth of birth rate, and consequently, sustainable socio-economic development of the country and its regions.

The results of our study and the proposals that we put forward can be used as an information base for management decision-making, transformation of social and demographic policy, as well as by teachers and students of higher education institutions and all those interested in the evolution of the institution of family in Russia.

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Perception of Corruption as a Socio-Economic Phenomenon by the Population of a Region: the Structural Aspect

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Abstract. The article presents an experience of a structured study of a special socio-economic phenomenon – corruption – in the aspect of its perception by different groups of population of a region. The study was conducted by Kostroma regional branch of the Russian Society of Sociologists in several stages: civil servants of the Kostroma Oblast Administration were interviewed in 2015, an online survey of university graduates of the city of Kostroma was conducted in November 2016, and finally, surveys of representatives of the business community[1] of the Kostroma Oblast were conducted in 2017. The goal of the survey was to assess the perception of corruption as a socio-economic phenomenon; the assessment was carried out through analyzing and interpreting the data obtained in the course of the surveys on the following topics: assessment of the level of corruption in general, perception of the level and dynamics of corruption, and possible ways to overcome corruption, according to respondents. Having interpreted the results of the survey we reveal the attitude of different target audiences toward the understanding of the phenomenon of corruption, its causes, and ways to combat it. In the context of the decree of Russian President Vladimir Putin "On the national anti-corruption plan for 2018–2020" signed June 29, 2018, the data we have obtained become particularly relevant for the development of sociological research techniques to assess the level of corruption in constituent entities of the Russian Federation (Section I, Paragraph 1, Letter "a") and to conduct scientific interdisciplinary studies, the results of which can be used to prepare proposals aimed to enhance anti-corruption measures and increase the efficiency of such measures in the business sector (Section V, Paragraph 21, Letter "b").

Key words: perception of the level of corruption, combating corruption, structural analysis, prevalence of corruption manifestations.

Relevance of the research topic

Recently, corruption as a challenge to state and public development and an issue persistently raised in the research community [1, 2, 3] becomes particularly relevant in all spheres of social life, which is confirmed, in particular, by the strengthening of the Russian anti-corruption legislation. Being a multidimensional social, economic, legal and moral phenomenon, corruption is the subject of various studies [4, 5] carried out in various disciplines, including related ones[2].

The issues of corruption are covered in the works of domestic researchers: S.V. Alekseev[3], V.V. Astanin[4], P.A. Kabanov [7], G.A. Satarov [4], M.V. Shediy[5] etc. Foreign researchers (O. Armantier, A. Boly [8], A. Barr, D. Serra [9], L. Cameron [10], M. Drugov, J. Hamman, D. Serra [11], B. Frank, G. Schulze [12], M. Granovetter [13], J.G.G. Lambsdorff [14]) consider corruption as an activity for personal enrichment with the characteristics of intention and ulterior motives. The concept of corruption as a socio-legal phenomenon is covered by the following Russian researchers: Y.I. Gilinskii, A.I. Dolgova [15], I.N. Klyukovskaya [16], V.V. Luneev [17], N.V. Selikhov[6], E.N. Trikoz, V.S. Ustinov, V.I. Shul'ga [18], and V.E. Eminov.

[1] Grant support by the all-Russian non-governmental and state educational organization "Russian Society "Znanie" (2017).

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Corruption is extremely difficult to measure because of its latent and shadow nature, yet there are attempts to do it [1]. According to the research of the Indem Fund, corruption in Russia reaches 80% of legal output of products in the entire Russian economy [4]. However, it is quite possible to measure the perception of corruption as one of the feedback mechanisms and aspects of social well-being of citizens in the society.

The number of multi-aspect studies of perception of corruption is extremely insufficient; federal research centers (VTsIOM, FOM, Levada-Center) collect snap measure-ments in the whole country, which do not reflect regional specific features, so the attitude to the phenomenon under study is reduced to 2–3 key questions in a questionnaire.

At the same time, in our opinion, the issue of structural and comprehensive assessment of this phenomenon lacks attention from a wide range of target audiences: the population, business representatives and officials of individual regions.

In this regard, the article presents the results of a large-scale research carried out without any support from government or commercial structures, domestic or foreign funds.

About the research

The research was conducted in several stages among different population groups (*Tab. 1*).

According to the table, in 2015 civil the administration staff of the Kostroma Oblast were interviewed through a formalized questionnaire (self-report). In November 2016, an online survey of university graduates of Kostroma was carried out by sending a questionnaire via social networks (Vkontakte). Finally, in 2017 two surveys were conducted: among the representatives of the business community (personal interview at work) and the population of the Kostroma Oblast (telephone survey based on a quota sex and age sample, taking into account the type of settlement).

The level of corruption and its perception is largely determined by the socio-economic situation in a territory, traditions, citizens' mentality and other features that are collectively defined as non-formal institutions.

The research object is the Kostroma Oblast – a region with the population of about 700,000 people, 350 km northeast of Moscow. The region's profile is textile, machine building,

Table 1. Target audiences of sociological research

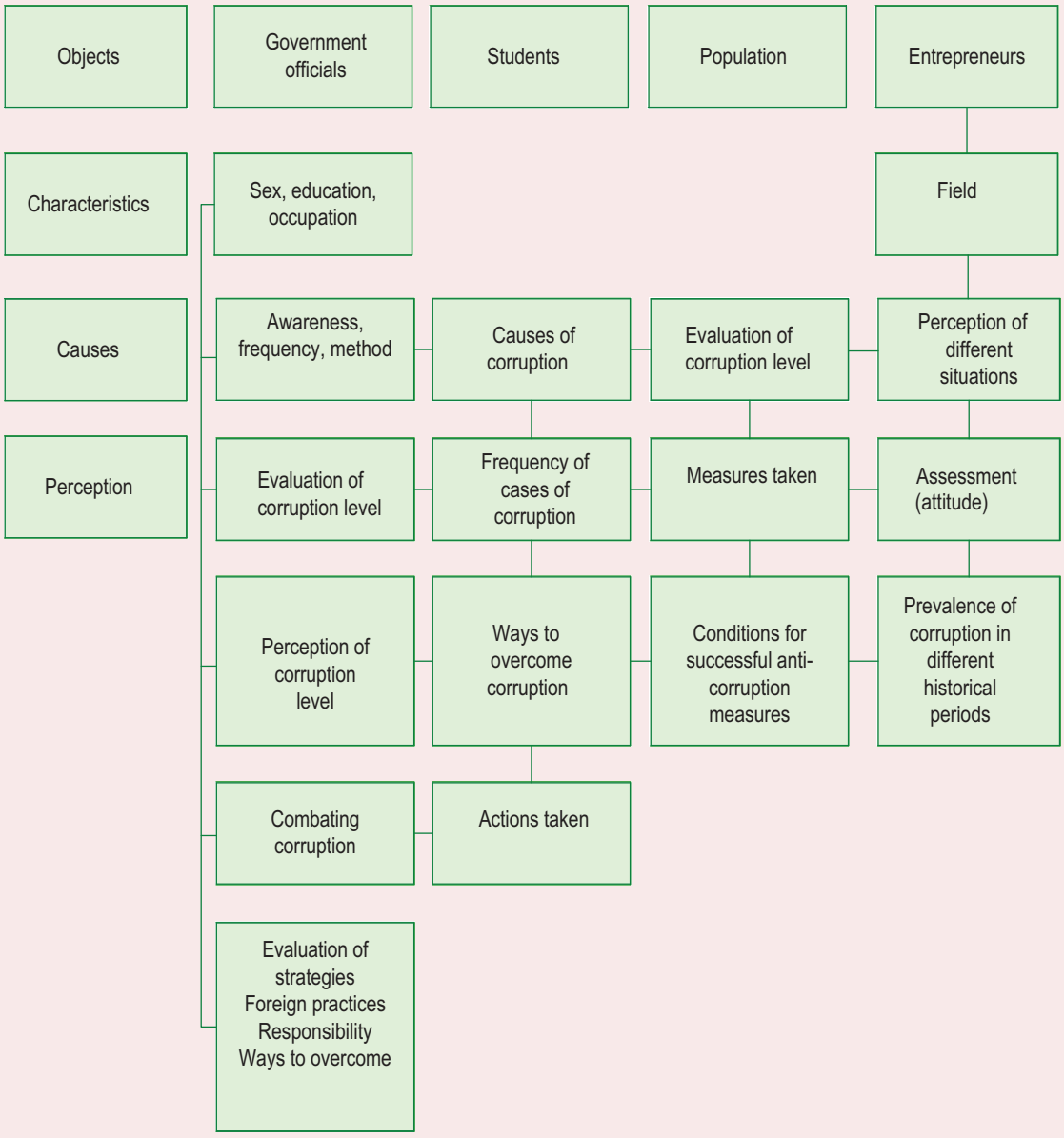
Survey period	Survey method	Respondents	
		Characteristics	Number of people, people
September–October, 2015	Anonymous survey (self-report formalized questionnaire)	Administration staff of the Kostroma Oblast	152
November, 2016	Social media survey	University graduates in Kostroma	200
March, 2017	Phone survey	Population of the Kostroma Oblast	700
November, 2017	Face-2-face survey	Entrepreneurs	250
Total			1302

[6] Selikhov N.V. *Corruption in the state mechanism of modern Russia (theoretical aspects): Candidate of Sciences (Law) dissertation.* Yekaterinburg, 2001.

woodwork and jewelry production, as well as trade and public catering. As for the most important indicator of regional economy – the standard of living – it is low among all regions of the Central Federal District[7], while the citizens' socio-political preferences are to some extent "patriarchal".

Kostroma is traditionally considered a "Red Belt": here left parties (including the Communist Party) have had more support in local and federal election than the average in Russia since the 1990s. Kostroma is considered a typical provincial town ("a quiet remote settlement").

Figure 1. Structural analysis scheme



[7] *Russian regions ranked by quality of life – 2017.* RIA ranking. Moscow, 2018. Available at: http://vid1.rian.ru/ig/ratings/life_2017.pdf

It is noteworthy that the following analysis was conducted according to the scheme presented in *Figure 1*. The general scheme of structural analysis includes four groups of respondents.

Data analysis and interpretation

Survey of Kostroma government officials

According to the stereotype of the ordinary people, government officials represent those potentially most corrupt, despite the fact that the activities of government officials are diverse. Their duties are to ensure the efficiency of public administration, which is based on the laws of the Russian Federation. They are prohibited from doing business and, as non-producers of products, they provide services for their efficient distribution.

73.8% of interviewed officials are women. 96.7% of the surveyed officials have higher education, most often in Economics, Engineering and Law. Half of respondents are heads of departments or their deputies (53 %), a third – executives and department specialists. Such a structure of bureaucracy is expected and corresponds to the Russian trends among regional officials: the predominance of women and older employees [19].

The research objective is to analyze and interpret the data obtained from the answers to the following question pools (*Tab. 2*).

Government officials estimated the situations offered in the questionnaire regarding their corruption component in different ways (*Fig. 2*). A little more than half of respondents (57%) note cases of corruption when it comes to solving the problems of a businessman after dinner with an official in a restaurant. At the same time, less than a third (29.5 %) consider the situation when an official hires a relative as corruption. The respondents' opinions are the same in relation to the situation of bribing a traffic police inspector or a judge to escape punishment.

Based on the analysis, we summarize that corruption is interpreted by Kostroma officials not in its broad sense (abuse of authority), but as "bribery" [19]. According to officials, the governing motive of bribery is a personal desire of an official to become enriched, rather than external circumstances. However, the main reasons for corruption development in Russia, in their opinion, are: the contradiction of laws and power and business coming together. Culture, mentality and traditions that trigger corruption are much less common.

Table 2. Questions for structural analysis of government officials

No.	Unit of thematic analysis (for respondents)	Thematic pool
1.	Awareness of bribery	Assessment of corruption level
2.	Frequency of bribery	
3.	Methods of bribery	
4.	Initiator of bribe	
5.	Level of perception of corruption	Perception of corruption level and performance
6.	Performance of corruption level in the region (country)	
7.	Measures taken by federal authorities to overcome corruption	
8.	Ways to overcome corruption	Overcoming corruption
9.	Perception of cases of corruption in terms of corruption components	
10.	Evaluation of anti-corruption strategies	
11.	Appropriateness of applying international practices	
12.	Responsibility for corruption	
13.	Causes of corruption	
14.	Share of monthly turnover for "stimulating" officials	
15.	Ways to overcome red tape among officials	

Figure 2. Interpretation of different situations in terms of corruption, according to officials, %

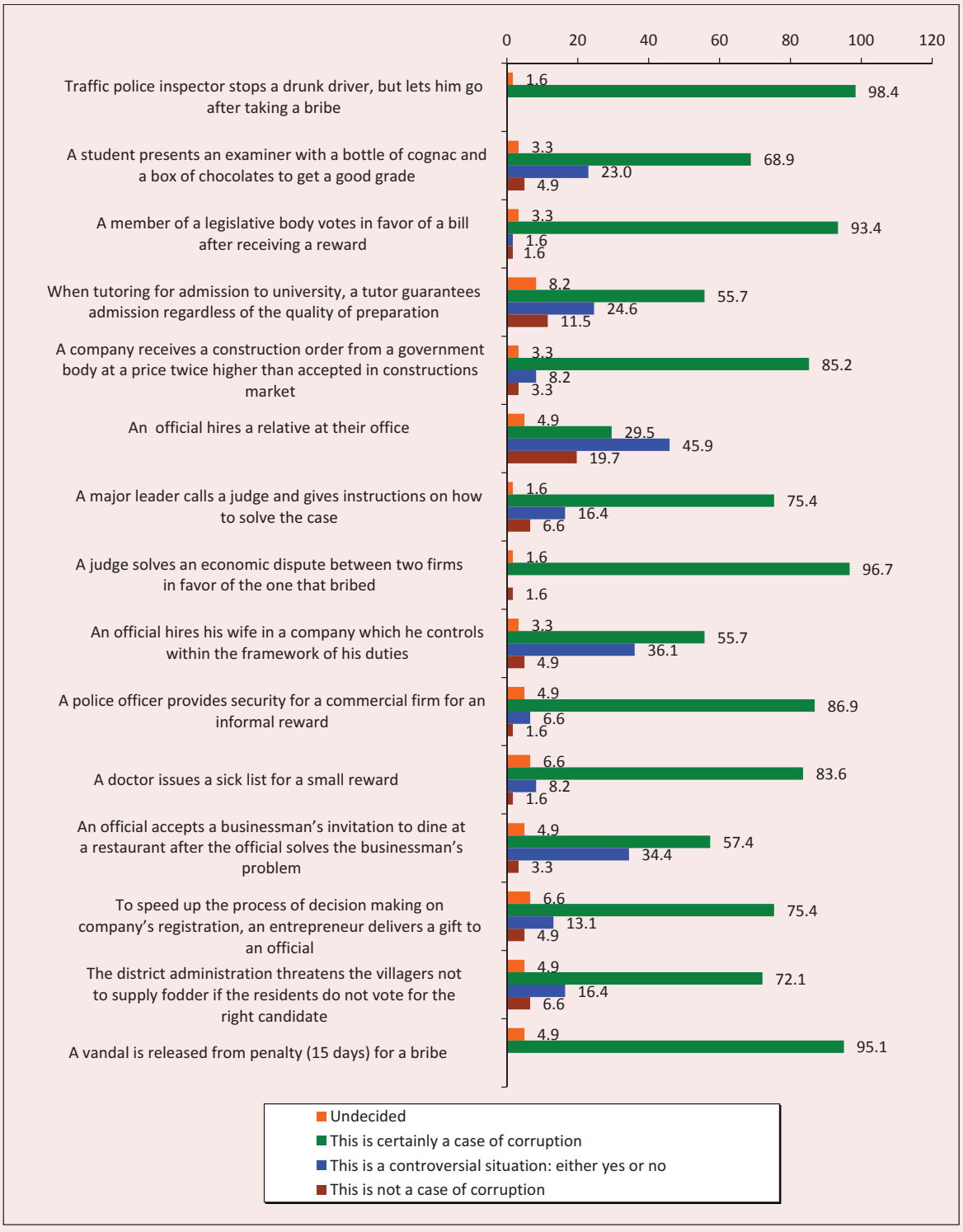
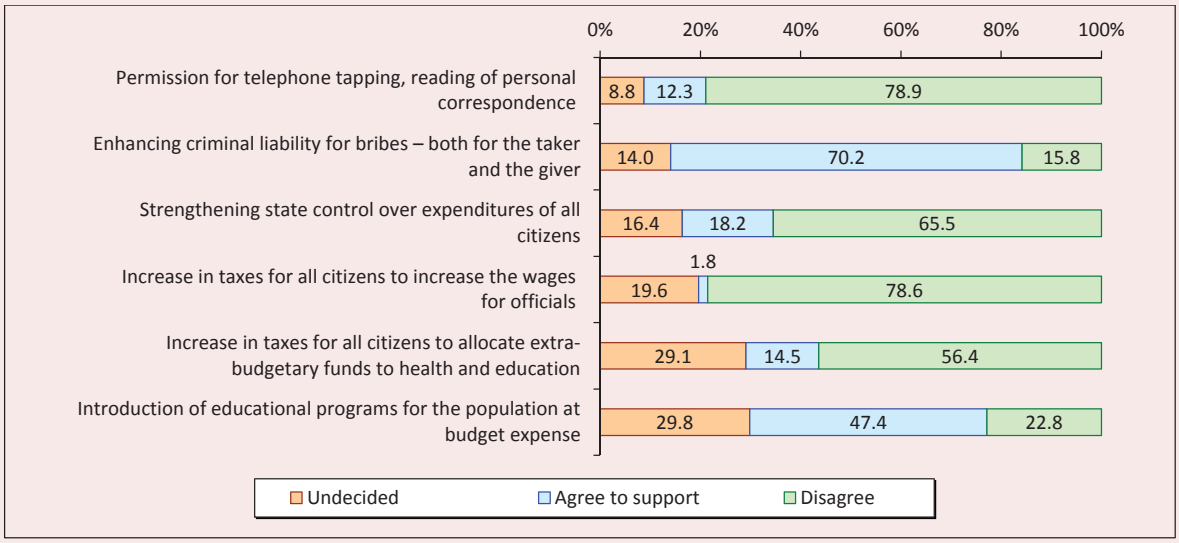


Figure 3. Effective measures to reduce corruption, according to officials, %



The respondents were also to assess the effectiveness of measures taken to reduce corruption. In their responses, they called for increased liability (both for the bribe-giver and the bribe-taker) and for the introduction of educational programs for the population. Telephone wiretapping and reading personal correspondence are the least supported aspects (*Fig. 3*).

A survey of university graduates in Kostroma

Characteristics of students as a special socio-economic group. The term "student" translated from Latin means "dedicate oneself to study". Russian and foreign authors approach the characteristics of this group by highlighting different aspects (such as mastering a set of social roles, especially professional and labor), but most agree that this group that what they have in common is stubbornness, the desire for independence and, most importantly for our analysis – a keen sense of justice [20]. Moreover, their initiative, interest in moral issues – goals, lifestyle, love, loyalty, etc. is increased. Young people certainly have innovative potential for the development of the economy and social sphere, and at the same time can act as a powerful potential for protest moods. Moreover, young people, including future managers, are tomorrow's human potential of the country. From this point of view, it is important to know how young people feel about corruption, whether they are concerned about the scale of the problem, whether they can break the law, whether they understand how to fight corruption. All this should be taken into account when analyzing the perception of various phenomena in modern Russia by this socio-age group.

66.8 % of surveyed graduates of Kostroma universities have not heard about the cases of bribery in universities, yet a third know about such cases.

The majority of respondents (73.5%) believe that corruption is unacceptable and therefore should be avoided; 23.3% believe that corruption should be avoided, but in some cases it is acceptable as it helps solve some life situations. For 3.2% of respondents, corruption is a necessary part of education and a normal process.

As for the subject of initiation of corruption, 45.2% of graduates who participated in the survey said that the initiators of corruption are students; according to 19.6%, both sides equally take the initiative; 13.1% say that university staff force students to give bribes.

More than half of the surveyed university students (59.8 %) found it difficult to answer how often they are forced to bribe lecturers: 25.1% of respondents say that this happens 1–2 times during the entire period of study, 7.5% – 3–5 times for the entire period of study, and 6% – 1–2 times per term.

The most common reason that motivates to bribe is getting high grades for tests, exams, theses or trying to avoid unsatisfactory grades (49% of respondents), the second most common – getting high grades for state examinations and theses (24.7%). The following motives of corruption were also mentioned: transfer of students from paid to free education (12.6 %), transfer from faculty to faculty (5.6 %), obtaining social benefits (4.5 %).

The most common methods are: delivery of money (44.7%), delivery of valuable gifts (37.6%), delivery of flowers and sweets (24.4%), arranging a stand-up buffet (19.8%), provision of services to the lecturer, the department (12.7%).

Thus, most often initiative comes from students with the main motive – getting high grades for term exams, state exams and theses. The most common forms of bribes are money, valuable gifts, flowers and sweets, as well as activity in social networks (likes on lecturer's pages).

Note that students do not inform the university management about the cases of bribery mainly because of the fear of negative consequences from the administration and staff, unwillingness to pass for "a snitch", as well as the unwillingness to change the existing order.

Survey of the population of the Kostroma Oblast

A little more than a third of respondents (39.7%) believe that in the placxe (city) where they live, the level of corruption has not changed over the past 5 years; 35.5% of respondents found it difficult to answer the question: 17.2% – think that corruption has increased, and only 7.7% said that it has reduced.

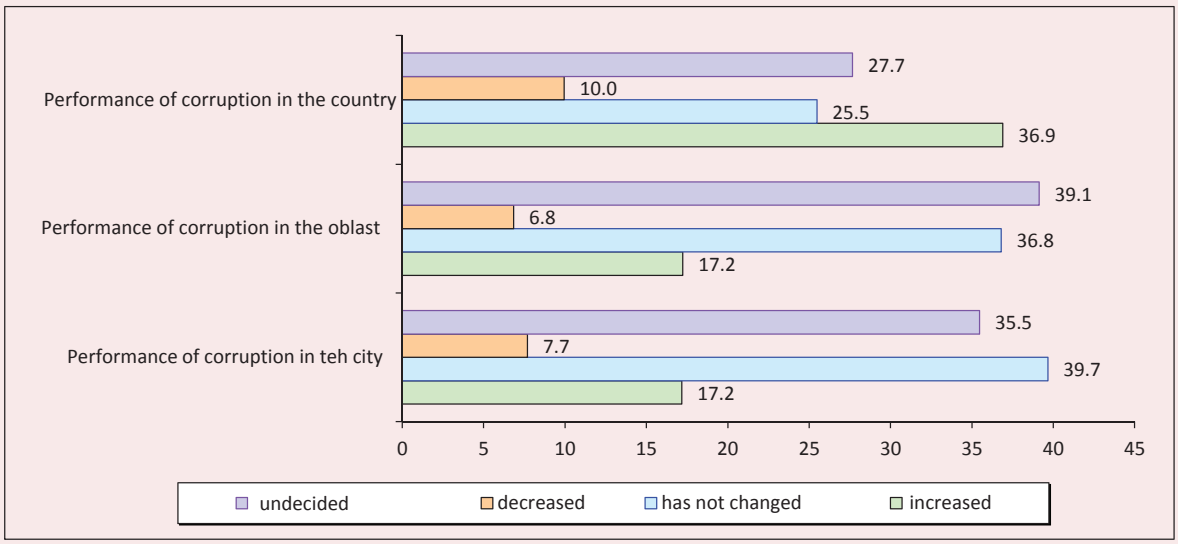
A similar distribution of respondents' opinions was obtained when assessing the changes in the region. 39.1% of respondents were undecided; 36.8 % reported that "the level of corruption has not changed", 17.2 % – "corruption has increased", and 6.8 % – "corruption has decreased".

The distribution of answers to the question about the level of corruption in Russia as a whole is somewhat different. The majority (36.9%) finds that "corruption in the country increased over 5 years", 25.5% – "corruption level has not changed", 27.7% were undecided, 10.0% of respondents said that it has decreased (*Fig. 4*).

10.6% of respondents constantly monitor the measures taken by the federal authorities to fight corruption; another 16% answered "I known about them but do not specifically follow the federal agenda for fighting corruption"; about 40% "heard something about it, but do not constantly monitor it"; about a third of respondents (30.9%) do not know anything about them, and 1.9% were undecided.

7.7% of respondents could not name what anti-corruption measures are taken by the federal authorities in Russia (the answer is "difficult to answer"); while 13.8 % of respondents believe that federal authorities "do a lot to fight corruption", and almost half (48.7%) said that "there are few measures taken to fight corruption"; another 19.7 % believe that federal authorities do nothing to fight corruption in Russia.

Figure 4. Public perception of corruption performance, %



The respondents think that success in fighting corruption is only possible through joint actions of authorities and citizens, only if "each and everyone" takes the initiative – so say 2/3 of the respondents (66.8 %). Another 12.1 % believe that corruption will be reduces if President wants to reduce it; 16.1 % are skeptical and believe that corruption cannot be rooted out – "they used to steal, they steal and they will steal"; only 5% of respondents were undecided.

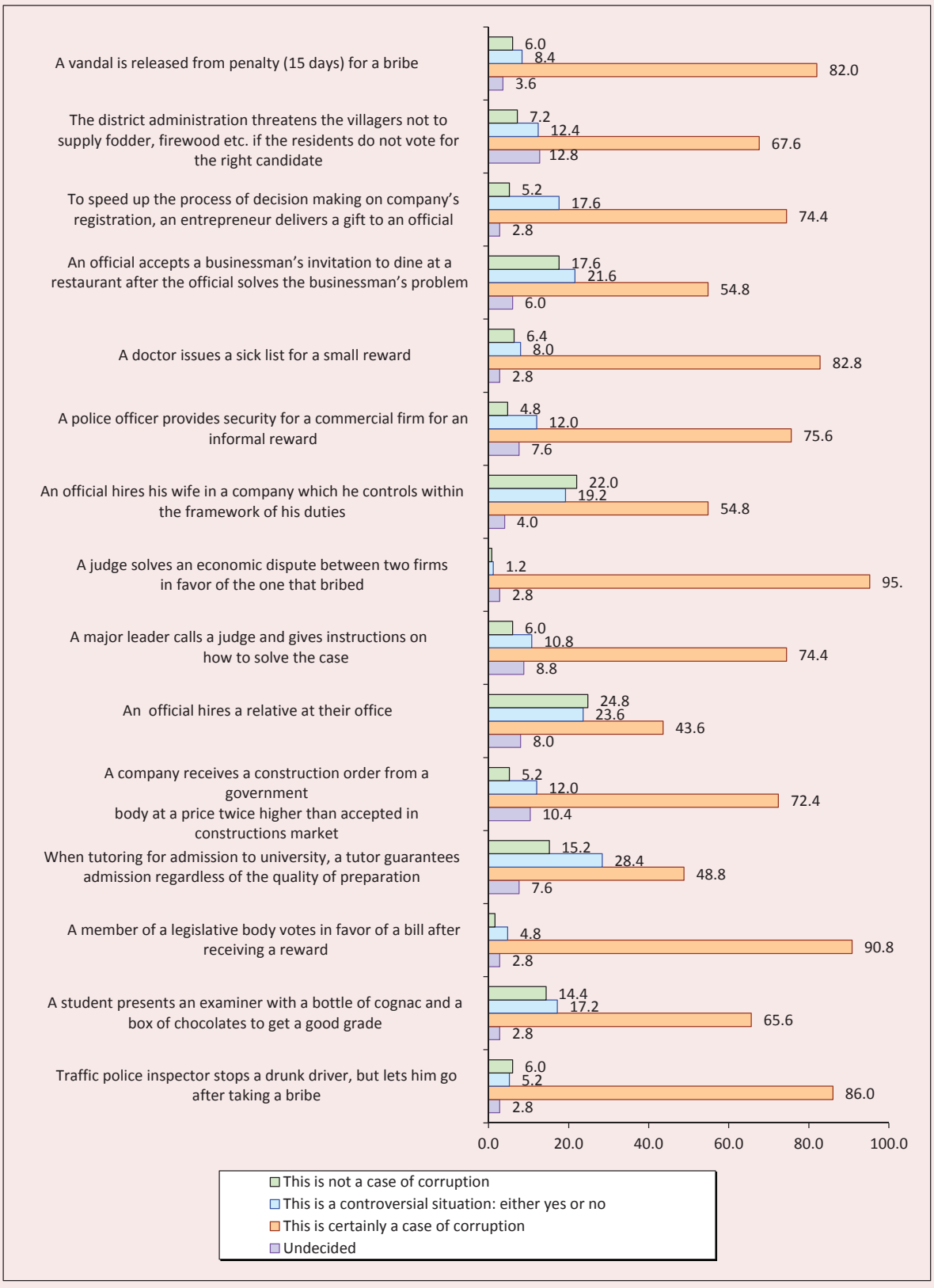
Further, the respondents were offered situations in which actions can be regarded to some extent as a manifestation of corruption. Four cases are singled out, where the vast majority revealed a case of corruption. These are situations when "a traffic police inspector lets a drunk driver go after taking a bribe" (89.9%), "a judge solves an economic dispute in favor of the party that bribed" (89.2%); "the district administration threaten the villagers not to bring fodder if the residents do not vote for the right candidate" (86.4%); and "a member of a legislative body votes in favor of a bill after receiving a reward" (82.5%). Moreover, there are several situations that people often assessed as controversial. These are the cases when an official hires his wife to work in a company which he controls, and when an official hires a relative.

According to the respondents, the controversial cases are also those where a bribe is taken not in the form of money, but in the form of a gift. This indicates that the phenomenon of corruption is interpreted by respondents not in its broad sense enshrined in the law as "abuse of authority", but much more as "bribery".

The study shows that the residents of the Kostroma Oblast have different perception of the performance of corruption. They believe that corruption in the city and the region has not changed over the past 5 years (the largest share of respondents), and even increased in the country as a whole.

This is confirmed by the data of the annual report of the all-Russian anti-corruption public reception center "Clean Hands", which analyzed the number of appeals in 2014–2015 and noted a significant increase in corruption

Figure 5. Perception of various situations for elements of corruption, %



in Russia in the mid-2010s compared to the early 2010s. In particular, according to the observations of experts, in 2015 alone a rapid increase in corruption is recorded, this increase beat "the record" in 2012, when corruption reached its maximum and demonstrated a downward trend.

Survey of entrepreneurs of the Kostroma Oblast

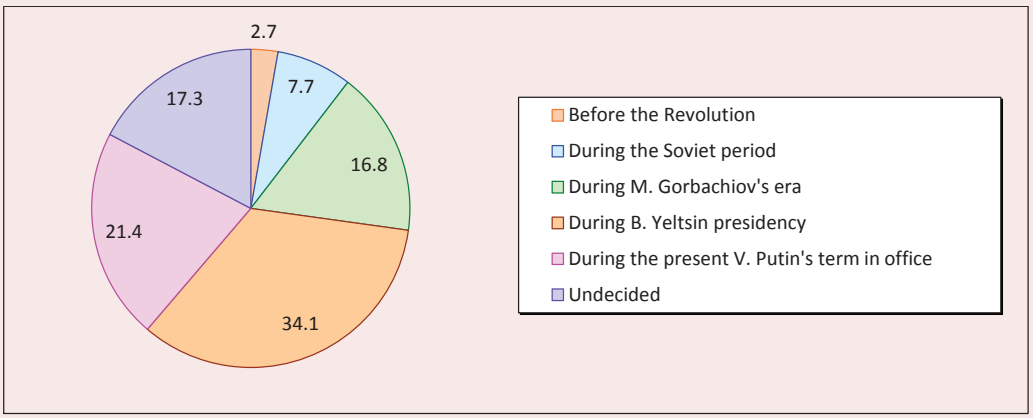
The perception of corruption by the most active part of the population – entrepreneurs – was studied in detail. A survey of entrepreneurs of the Kostroma Oblast demonstrates that the service sector is the leading among the three main types of their activities (47.2 %), followed by trade (36.0%). Production sector, construction and transport rank third (16.8%). The vast majority of surveyed entrepreneurs refer to their company as small business (90%), while only 10% – medium business.

The respondents were asked to express their attitude to the fact that Russians often have to give bribes to have their problems solved. The respondents were given three statements to select from. Opinions were divided the following way: the vast majority (68.8 %) of respondents believe that bribery should be avoided since corruption is the path towards degradation of the society and the authorities; 14.4% relate to corruption as an undesirable phenomenon, which, however, makes life easier; 8.8% believe that corruption has become a necessary part of our lives; 8.0% of respondents were undecided.

The respondents were asked to assess 15 situations to determine the presence of corruption (*Fig. 5*). Thus, 43.6% of respondents consider the situation when an official hires a relative corruption; a little more than a half (54.8%) – when an official hires his wife to work in a company which he controls; the same number of respondents – when an official accepts a of businessman's invitation to dinner at a restaurant after the official solves the businessman's problem.

In our opinion, an important point in assessing the perception of corruption is to assess the prevalence of corruption in Russia at different historical stages over the past 100 years (*Fig. 6*). Thus, a third of respondents (34.1%) believe that corruption and all its components were most common during the presidency of Boris Yeltsin; 21.4% – consider corruption peaked during the period of Putin's presidency;

Figure 6. Prevalence of corruption in different historical periods, according to respondents, %



17.3% – were undecided; 16.8% – believe it was "the Gorbachev's era"; 7.7% – the Soviet period; and only 2.7% consider the peak of corruption was before the Revolution.

The public evaluation of a phenomenon widespread in foreign practice such as "anonymous reports of corruption cases" is of great interest. Opinions were divided almost evenly: 24.0% of respondents believe that such a system is ineffective as it is difficult to stay anonymous; 20.8% believe that if someone has information about cases of corruption they should anonymously report it to the relevant authorities; 18.4% – believe that this practice can discredit honest people; 15.2% – believe that such a system is not necessary in Russia; 15.2% – consider such a system ineffective as corruption naturally helps people solve problems; 6.4% of respondents were undecided.

Answering the question of who is responsible for corruption in Russia the respondents were divided into two groups: 39.6% believe that fighting against corruption is necessary first of all to the government; 31.6% are skeptical about fighting against corruption, saying that it cannot be rooted out: "they us3d to steal, they steal and they will steal"; the remaining 26.8% of respondents think the responsibility for fighting corruption lies on the society as a whole – both on the government and on citizens; they believe that it is only possible to solve the problem together.

Further, we identify the possible causes (out of 28) of corruption in Russia, and the degree of their impact on corruption (*Fig. 7*).

The most significant causes of corruption, according to respondents, include: the vagueness of laws, which provides an opportunity for their broad interpretation (87.4%); corrupt authorities at the highest level (85.8%); contradicting laws (83.3%); freedom of action at the discretion of the official (82.9%); the need to coordinate approvals (when the permissive principle prevails over the declarative) (80.1%).

According to respondents, the following problems affect corruption to a lesser extent: incomplete privatization (32.1%); incomplete economic reforms (41.1%); state intervention in the economy (42.7%).

Entrepreneurs were offered several strategies for fighting corruption in Russia to choose from. Almost half of the respondents (48.0%) consider the best strategy to combat corruption to be merciless punishment for all corrupt officials; about a third of respondents (30.4%) believe that first of all it is necessary to eliminate the conditions that generate corruption; 9.6% believe that it is necessary to replace dishonest leaders with honest ones; 6.0% of respondents are skeptical, believing that no strategy will help fight corruption; only 4.4% are ready to resort to merciless punishments for bribe givers; 1.6% – were undecided.

Entrepreneurs often say that they have to bribe authorities. Respondents were asked to estimate what share of their company's monthly turnover they spend on "stimulating" officials. The results of the survey are demonstrated in *Figure 8*.

More than half of the surveyed entrepreneurs could not specify the share of bribes; 17.6% refused to answer this question. 11.6% of respondents believe that enterprises like theirs do not have to spend money on bribery; 7.6% – believe that business representatives spend 1–15%, and, according to only 4.8% of respondents – 16–30%.

The vast majority of respondents (85.2%) try to avoid the authorities and have as little business with them as possible, for which they

Figure 7. Causes of corruption in Russia, according to entrepreneurs, %

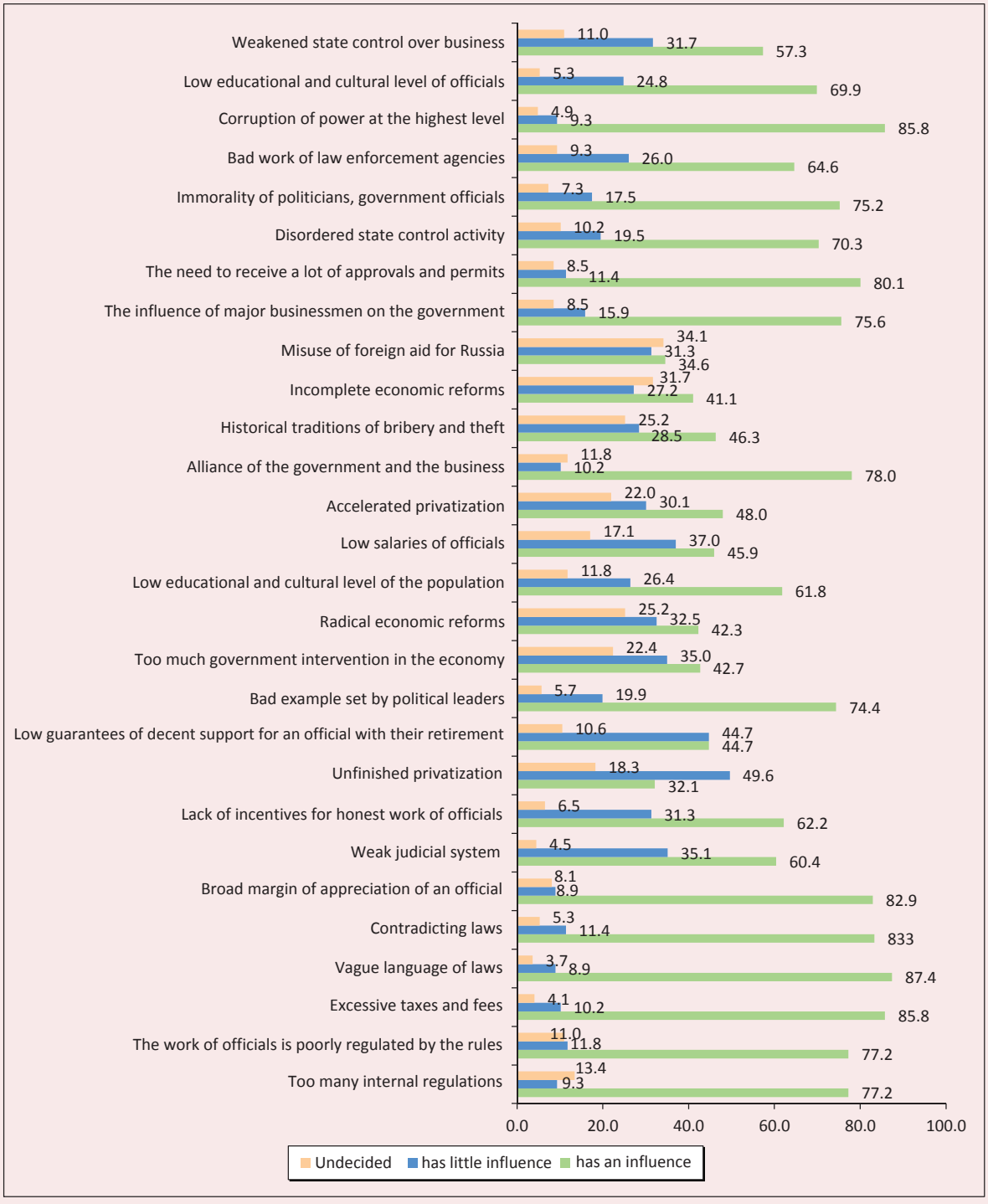
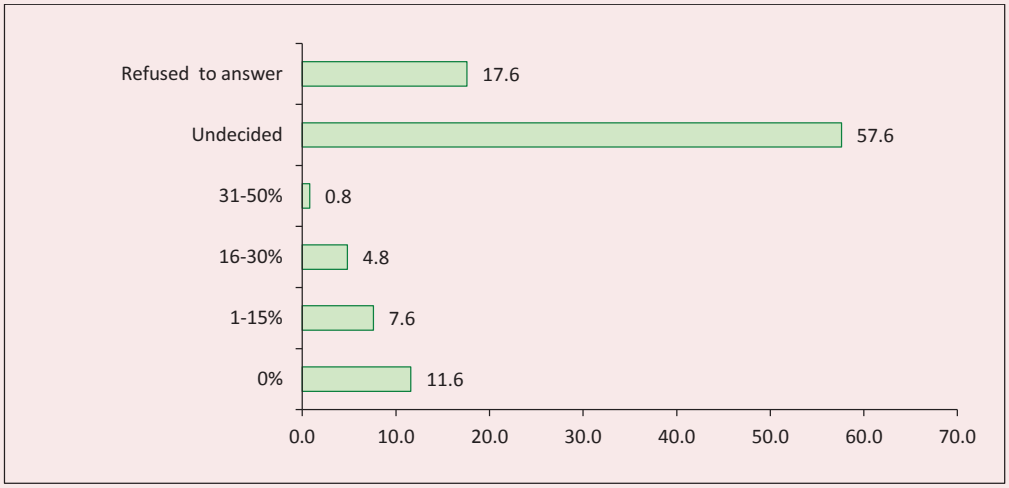


Figure 8. Share of company's income allocated to "stimulate" officials, %



have to obey the laws, which, in the end, according to entrepreneurs, often hinders the case; only 8.4% of respondents use any means of influence on the authorities in their own interests; 6.4% feel free violating the law while avoiding conflicts with the authorities.

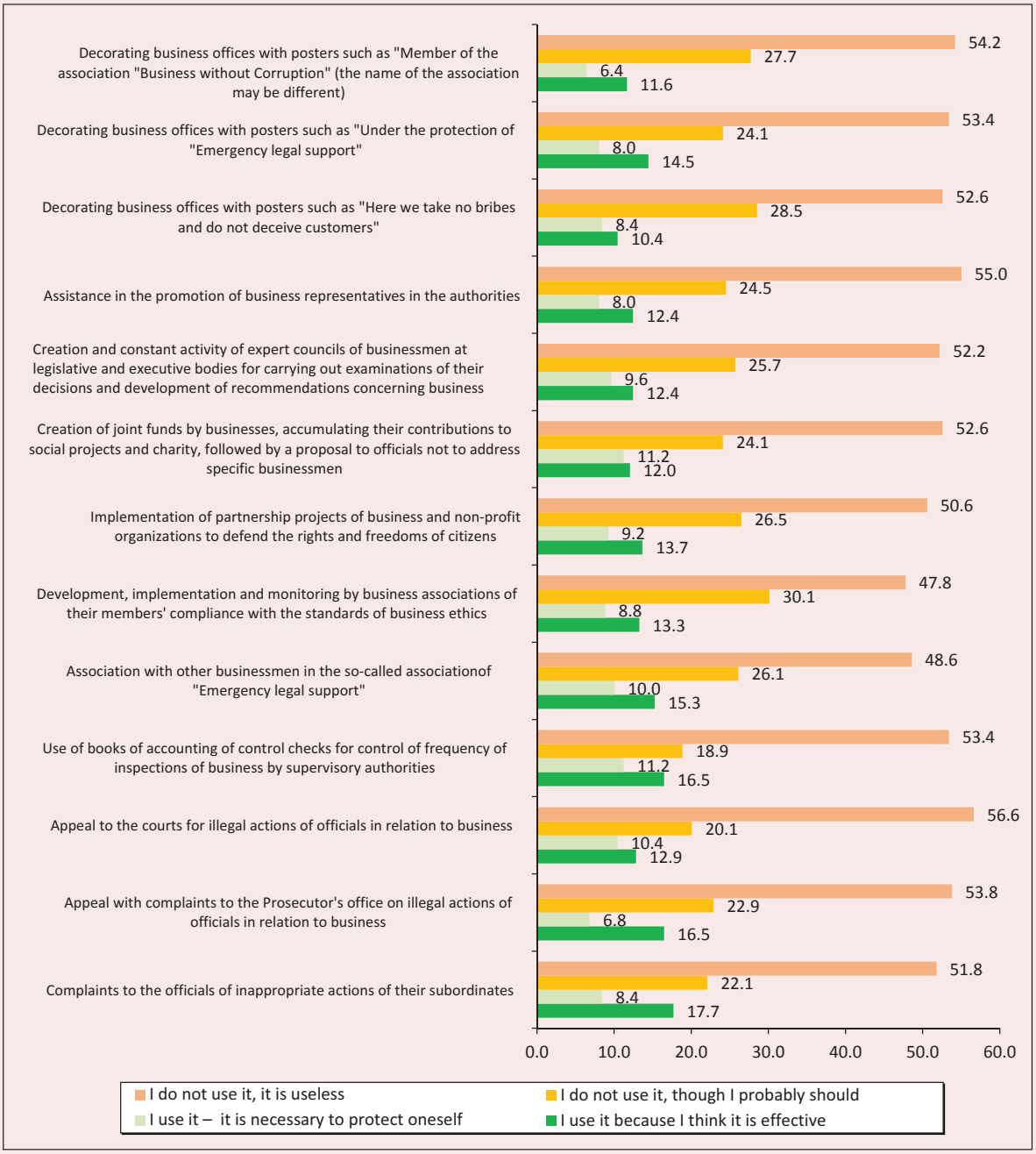
Figure 9 demonstrates how to oppose the corruption of officials and their effectiveness. Opinions are divided almost evenly. In general, the respondents considered all these methods ineffective. At the same time, the most effective methods used by entrepreneurs are: complaints to officials about illegal actions of their subordinates – 17.7 %; complaints to the Prosecutor's Office about illegal actions of officials in relation to business – 16.5 %; the use of books of accounting to control the frequency of inspections of business by regulatory authorities – 16.5 %.

The most useless ways of combating corruption, according to entrepreneurs, are as follows: filing claims to courts for illegal actions of officials in relation to business – 56.6 %; assistance in promoting business representatives to the authorities – 55.0 %; decorating business offices with posters such as "Member of the Association "Business without Corruption" (the name of the association may be different) – 54.2 %.

Next, we find out the opinion of entrepreneurs about the potential long-term behavior in fighting against corruption, which were divided almost evenly: almost a half (48.8%) will try to take part in the fight against corruption in Russia; 43.2% – will observe; only 8.0% consider this a useless venture.

The last two questions indicate that entrepreneurs have a certain apathy toward the problem of corruption; but on the other hand, it shows a significant potential, the initiative "from below", which intersects with the all-Russian, non-corruption trends observed in recent years: the growth of the share of "self-sufficient" Russians and the replacement of the need for stability with the need for change. Thus, according to M. Gorshkov, Director of RAS Institute of Sociology, "in the last two and a half years, stability has started to be perceived as a synonym for the stagnation of the situation observed in the crisis years" [7]. Linking this with low electoral activity, he explains that the respondents understand the changes as "a

Figure 9. Methods to fight corruption of officials and their effectiveness, %



significant increase in the standard of living and quality of life, a breakthrough in the technological development of the country, strengthening the "defense industry", changing the situation in the regions, especially in medium and small towns, overcoming regional inequalities"[8].

Conclusions and recommendations based on the studies

The research and the structural analysis have shown that the population, government officials, students and the business community understand corruption not in its broadest sense defined in the legislation as "malpractice", but much narrower – as "bribery". Therefore, in order to prevent corruption manifestations among the authorities, *it is important to change the attitude toward corruption with the help of anti-corruption programs and to change the way it is perceived;* it should be perceived as "the use of the authority and the rights entrusted to the officials, their authority, opportunities and connections for personal gain, contrary to the law and moral guidelines".

If we compare Russia's historical periods, the era of Boris Yeltsin looks the most "corrupt", while the perception of corruption in the modern period of V. Putin's rule can be compared to that in the period of Mikhail Gorbachev's perestroika. At the same time, the respondents consider that the state has no visible general line of fight against corruption: one part of the respondents "heard something about anti-corruption", the other says they heard nothing about it. In this regard, the state should consistently, actively and systematically disseminate successful experience in combating corruption in the public PR-space.

Almost all groups of respondents reported the need for joint actions in the fight against corruption as a combination of public control and strong political will of the President of the Russian Federation. Respondents point out that corruption in Russia can be eradicated if such a combination of efforts is used. Therefore, it is necessary to talk about the creation of an effective system of personal responsibility of officials at all levels of government, which should be spelled out in the national anti-corruption plans and designated as a condition for the effective implementation of national projects of the President of the Russian Federation and for ensuring social stability in the country.

In anti-corruption strategies, respondents are more inclined to increase the ruthlessness of punishments for all corrupt officials than to eliminate the conditions that give rise to corruption. Respondents mention the second mechanism considerably less frequently. It seems that the once proclaimed thesis according to which "the inevitability of punishment is more important than the severity of a just retribution" has lost its effect. Both inevitability and adequacy of punishment are important. Developing the idea, let us clarify that criminal prosecution must be inevitable, and the severity of the punishment should be comparable to the crime committed.

The Prosecutor's Office, according to entrepreneurs, is the most effective institution in combating corruption (unlike other institutions, including the court of general jurisdiction). In the war against corruption declared by the President of the Russian Federation the "sovereign's eye" looks like a

[8] Stability or change? What do Russian citizens expect from the state? (an interview with M.K. Gorshkov, Director of RAS Institute of Sociology). *Argumenty i fakty,* 2018, no. 31, August 1.

very appropriate feedback together with the branches of the All-Russian Popular Front working in the regions.

The study has found that almost half of the respondents take on a role of onlookers and refrain from taking an active part in the fight against corruption in Russia. No doubt, such a wait-and-see position hampers the fight against corruption. Young people and entrepreneurs (as the avant-garde part of society) are not ready to act as a locomotive in this process. Besides, the mentality of Russians testifies that to report a corruption crime means "to become a stoolie", rather than to cooperate with justice (as in any Western country).

As the survey shows in general, the regional community has domestic (grassroots) corruption; the economy of favors is flourishing in the absence of prohibitions and restrictions; the ability of the government to solve social problems is reduced, and the most active part of the population – entrepreneurs – in their answers show a decrease in their trust in the government, the alienation of which from society is growing.

The results of the survey also indicate that the problems of corruption can be solved by implementing a targeted set of measures in all spheres of life of the state and society and only through joint efforts.

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Criteria and Resources for Social Adaptation of Russia's Population*

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Abstract. The stress caused by social changes that Russia's population experienced due to the change of the socio-economic order forced them to choose adaptation behavior strategies: from active influence on the environment to avoiding problems. In these conditions, the developing branch of knowledge – the sociology of adaptation – was interested in the socio-economic aspects of the issue associated with changes in living standards, social status and economic behavior strategies of members of different stratification groups and the impact of different types of capital. However, studying adaptation as a component of social health is equally important. The goal of the present paper is to study social adaptation of Russia's population and identify its groups with different adaptation potential. We focus on adaptation in terms of resource and subject-activity approaches. European Social Survey data (Russia, sample size is 2,484 people) serve as an empirical base of our research. We consider social adaptation through the indicators of its result: adaptation level and through resources. We identify four latent variables using latent structural analysis of the observed variables that reflect different aspects of adaptation. Two of them characterize the result of adaptation: positive mental health and subjective activity (active behavioral practices in a changing environment). The other two are adaptation resources: internal (high adequate self-assessment, subjectivity, internal locus of control) and external (social support). Using latent-structural analysis we determine the grounds for stratification of Russian society according to the "social adaptation" criterion. We identify groups that are problematic in terms of the dynamics of adaptation processes in the case of the changes in the initial data such as an increase in the external load or a decrease in external resources.

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We reveal that from the standpoint of the subject-activity approach the maladjustment of an individual is connected with their alienation in professional activity. The novelty of our work lies in the fact that it implements an interdisciplinary approach to the study of social adaptation.

Key words: social adaptation, resource-based approach, activity-based approach, adaptation potential, social subjectivity, social support.

Introduction

A new surge of attention to the research on adaptation is due to the increasing role of man as a subject of activity in conditions of "opacity, vagueness, uncertainty and instability of the social situations in which people have to act" [1, p. 598]. Radical changes in the life of society are always accompanied by the "stress of social change" [1]. There is evidence that economic crises accompanied by financial pressure lead to deterioration of mental and physical health. Thus, as the economic situation becomes worse, the number of cases of deviant behavior, including suicides and alcoholism, increases significantly [2, pp. 75-92; 3]. The scale and pace of economic change in the Russian society in the 1990s did not match the adaptive resources of the majority of its members. According to researchers, no more than 25% of the population was able to adapt to dramatic changes in the social structure and institutions and to the return to the market mechanisms in the economy [4, p. 14]. After all, in the conditions of bifurcations, the load from the external environment increases and an individual has to use all available resources to the fullest extent, but subsequently the depletion of adaptive resources increases the probability of adaptive failure or adaptive risk [5].

The relevance of research on the nature of social crises, social disintegration and pathology, adaptation, its mechanisms and resources required the institutionalization of a new field of knowledge – the sociology of adaptation [5, p. 11]. Sociological science has focused on the study of socio-economic adaptation [6; 7; 8; 9]. Scientists focused on the changes in the standard of living and the strategy of economic behavior of Russians and on assessing their resource potential. At the same time, there has been an increase in the number of publications devoted to the impact of economic crises on social well-being and in which adaptation was considered through the prism of public mental health increased [10; 11]. Today there is a need to systematize the knowledge about social adaptation from the perspective of the subject, about the adaptive resources of the population and about the stratification of society according to the "social adaptation – maladjustment" criterion. An integrated and interdisciplinary approach to this problem involves research on the basis of indicators that reflect people's economic behavior during socio-economic crises and their mental well-being, as well. Indeed, for example, E. Durkheim noted that "social facts are the results of special processing of mental facts" [12, p. 478].

Initially, adaptation was considered as adjustment to the environment, and its result – as a state of equilibrium and homeostasis; in sociological theories – the balance between the institutional environment and individual behavior. This approach is seen in E. Durkheim's concept of acceptance of social norms and socially approved behavior [12], in M. Weber's interpretation of an optimum way to satisfy the needs of an individual [13]. Representatives of the structural and functional approach pointed out that to explain the essence of the adaptation process it is necessary,

first, to analyze norms, values and goals and second, to analyze the possibility of their implementation. According to supporters of this approach, adaptation is a balance between the value and needs of an individual and the values and norms of the social environment [14, pp. 185-192; 15, pp. 7-25]. Thus, from the point of view of the normative concept, adaptation is the process of active adjustment of the subject to environmental conditions on the basis of internalization of social norms.

The evolution of views on adaptation processes has shifted the emphasis from adaptation to integration with the environment and further – to mutual transformation of systems. In the 1970s–1980s, along with the "adaptation" paradigm, scientists increasingly use the concept of "supra-normative activity" and "social subjectivity". Narrow consideration of adaptation–adjustment as the main indicator of the norm of behavior is replaced by a combination of two equivalent processes: adaptation and individualization. An individual psychological criterion of the norm of behavior is put forward; it includes an internal position of the individual in relation to the outside world and himself/herself, the ability to make decisions and make choices, and personal responsibility for his/her own behavior. The change of concepts was a response to social practice: the request to strengthen the influence of an individual led to the emergence of fundamentally new features of behavior and lifestyle, the shift from social conformism to social subjectivity and creative activity[1]; "...the previously passive role of the mass of participants of social interaction has changed dramatically" [16, p. 5].

There is an opinion that an individual is the only true subject of social adaptation, because the process of adaptation is directed from the individual toward society and not the other way around [14]. We have also built our research in line with the sociology of personality around subjective assessments of conditions, personality features and behavioral patterns that can serve as indicators of social adaptation or maladjustment and that are the variables which can be observed. Let us assume that adaptation processes are triggered by an imbalance of the two systems, when the patterns of an individual do not correspond to the current state of the social and institutional environment. An individual perceives such a deviation as a difficult life situation that requires mobilization of forces to return to the "normal" state.

Let us explain why we have chosen to consider adaptation from this very aspect. We adhere to a broad interpretation of social adaptation: it includes not only the processes of adaptation to the changing social reality through the internalization of social norms, but also the processes of individualization, which find their expression in the form of self-realization. In addition, we characterize social adaptation from the point of view of the subject through the result of this adaptation – adaptability and through an individual's adaptive resources that will be used if necessary to influence social environment (situation, other subjects).

In the operationalization of the category "social adaptation" we rely on the activity approach combined with the resource approach [17; 18]. When the subject is studied in the framework of the activity theory from the point of view of his/her resources, this expands the possibilities of interpretation of the data on adaptation, because "the subject's resource is a set of qualities that provide not only his/her ability to survive, but also his/her ability to expand the range of self-regulation" [17, p. 315]. Thus, if we are talking about self-regulation of behavior, then we can allocate

[1] Toschenko Zh. T. *Sociology. General Course.* Moscow: Prometey, 1994. Pp. 3-14.

the following personality features: adequate self-esteem, independence and responsibility as personal adaptive resources. Moreover, sociological works put forward new grounds for social stratification of population groups – "the level of adaptation to transformation process" [7, p. 327], "the volume and structure of resources" [18, p. 34]; the latter include economic, power, social, qualification, and cultural resources [19]. In our study, we use the indicators "providing/receiving support" to introduce the social resource in the analysis, since this resource is most closely related to the adaptation of an individual to the social system.

The result of adaptation can be assessed on the basis of the changes affecting the external behavioral responses of the adaptant and his/her internal state, which include needs, interests, responsibility, and activity [20, pp. 15-16]. L.V. Korel' proposes to consider social well-being (the internal state of the adaptant) and the presence of a set of solutions to various problems (external behavioral reactions) as the criteria for completion of adaptation [5, pp. 324-330]. Summarizing the provisions of sociological and psychological concepts, we come to the conclusion that they allocate the following indicators of adaptability: psycho-emotional stability, absence of anxiety, adequate self-esteem, time perspective and responsibility for one's actions [21, pp. 80-82], long-term planning, confidence in the ability to control their own living environment [17, pp. 314-317], the international locus of control, activity [22], self-efficacy [23], social status that reflecting the result of integration of the individual with the updated social environment [6]. Negative internal attitude toward social requirements, conflict, chronic emotional discomfort (from negative experiences to clinical psychopathologies) are considered as individual manifestations of maladjustment.

Research design

The aim of our research is to study social adaptation with the use of the qualimetric approach and on the basis of subjective assessments given by Russians. The empirical base of the study is presented by the data of an international comparative study within the European Social Survey (ESS) project[2] .

Based on the analysis of theoretical concepts and empirical data, we have put forward the following hypotheses.

Hypothesis 1: adaptation potential of the individual consists of resources that are internal and external. Among the internal resources, self-assessment of the individual plays a significant role in the process of adaptation, and social support –among the external resources.

Hypothesis 2: Differences in the current load of the environment (strong–weak) and adaptation resources (small–large) determine the allocation of groups differentiated by the level of adaptation: adapted, maladjusted and problematic.

With regard to the database of our study, we have identified the following indicators of adaptation results: mental health (indicators: the presence/absence of depression, anxiety, worry, feelings of loneliness, pleasure from life, exhaustion as the inability to summon up enough energy) and activity, behavior patterns ("slowly coming back to a normal state", "feeling like a loser", "make decisions easily", "envision the direction of life").

[2] A long-term comparative study of changes in attitudes, beliefs, values and behavior of the population is carried out by means of its surveys: in Europe – since 2001, in Russia – since 2006. The sample is 1,500–3,000 interviews in each country. Free access to the data of all researchers is provided through the electronic website www.europeansocialsurvey.org. Our analysis is based on the secondary data for 2012 (29 countries, the volume of 42,630 people). In Russia, the study was conducted by the Institute of Comparative Social Research in November – December 2012, the sample size was 2,484 respondents. Available at: http://www.europeansocialsurvey.org/data/download.html?r=6

Table 1. Descriptive statistics of variables characterizing social adaptation

Variable	Valid values	Missing values	Average	Standard deviation
d2 – optimism about my future	2439	45	0.74	0.19
d3 – good opinion of myself	2448	36	0.79	0.16
d4 – I don't feel like a loser	2427	57	0.70	0.20
d5 – depression	2441	43	0.43	0.19
d9 – loneliness	2439	45	0.43	0.20
d10 – I enjoy life	2376	108	0.67	0.19
d12 – I can pull myself together, summon up enough energy	2360	124	0.79	0.19
d14 – anxiety, worry	2444	40	0.50	0.19
d16 – I can decide for myself how to live	2466	18	0.79	0.17
d19 – I come back to a normal state slowly	2419	65	0.58	0.19
d23 – all I do is valuable and helpful to others	2396	88	0.74	0.17
d25 – I am strong in many areas	2395	89	0.65	0.18
d29 – My loved ones value it	2441	43	0.76	0.21
d30 – I make decisions easily	2425	59	0.64	0.20
d35 – I envision the direction of life	2422	62	0.72	0.22
d36 – I receive support from my loved ones	2468	16	0.74	0.23
d37 – I support my loved ones	2461	23	0.75	0.22
N valid (on the list)	1995			
Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/				

Adaptation resources were determined by such factors as: self-esteem (a good opinion of oneself; confidence that "All I do is valuable and helpful to others"; confidence that "I am strong in many areas"); internal locus of control (independence of decision-making concerning one's own life); vision of prospects in life (optimism about one's own future); high external score (confidence in what one's loved ones value); social support ("receive support from loved ones"; "support one's loved ones"). High social status can serve as an indicator or resource of the result of adaptation, so we used the observed variable "Subjective assessment of the social status" as an additional one when comparing groups with different levels of adaptation.

However, the variables we observe that were selected in the ESS database had response options with the use of different scales – four-, five-, seven- and ten-point scales. For clarity of results and correctness of application of mathematical statistics methods we rebuilt these variables as follows:

– maximum score for all variables was made equal to one;

– for ten-point scales, with a spacing of one point, an additional wider spacing was made – after 0.2 intervals: 0.2; 0.4, etc.;

– we changed the points assigned to answers in scales d2, d3, d12, d16, d18, d19, d23, d25 so that the maximum point (unit) corresponded to the consent with the statement made.

Descriptive statistics on the variables we have chosen that characterize social adaptation are shown in *Table 1*.

Taking into account the missing values, 1995 valid values of each variable were selected for the analysis.

Table 2. Results of the factor analysis of social adaptation of the population of Russia

Factor (latent variable)	Variable	Factor 1	Factor 2	Factor 3	Factor 4
Positive mental state	d9 – feeling of loneliness	-.737			
	d14 – anxiety, worry	-.714			
	d5 – depression	-.688			
	d12 – I can pull myself together, summon up enough energy	.682			
	d10 – I enjoy life	.408			
High self-esteem and agency	d25 – I am strong in many areas		.660		
	d16 – I can decide for myself how to live		.641		
	d23 – all I do is valuable and helpful to others		.639		
	d2 – optimism about my future		.637		
	d3 – good opinion of myself		.589		
Social support	d36 – I receive support from my loved ones			.840	
	d37 – I support my loved ones			.779	
	d29 – My loved ones value it			.627	
Behavior in a changing environment	d30 – I make decisions easily				.667
	d19 – I come back to a normal state slowly	-.319			-.636
	d4 – I don't feel like a loser				.556
	d35 – I envision the direction of life				.520
Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/					

Subjective assessments of social adaptation of the Russian population

Analysis of the average values of the variables in the array showed that Russians generally treat themselves well, look at their future with optimism and are confident in the support of their loved ones. At the level of the whole sample (valid variables) there are practically no symptoms of depression and feelings of loneliness (86 and 82% of respondents, respectively).

According to their self-assessments, the majority of Russians rarely feel anxiety and concern, but at the same time the value of the standard deviation suggests that there is a group of respondents who experience such negative feelings most of the time, and this group is 20%. A significant part of Russians are hardly aware of the direction in which their life moves (30%), and make decisions on the issues they consider important (22%).

We conducted a latent structural analysis in SPSS[3] program with the help of the factor analysis. As a result, we identified latent variables[4] (factors) of social adaptation of the Russian population (explained total variance – 56%, *Tab. 2*).

[3] SPSS is a program for statistical data processing. The data matrix was subjected to the procedure of factor analysis by the principal component method "PrincipalComponentAnalysis" with rectangular rotation according to the "VarimaxwitsKaiserNormalization" method. The number of factors was determined by the Kaiser criterion. In the analysis of the factor structure, the load of 0.350 on each factor scale was considered to be a significant factor load.

[4] The latent variable represents the constructs that are not measured directly and that can be represented by two or more observable variables [24, pp. 21-41]. The latent variable includes features that correlate with each other. Grouping the observed features and arranging them in latent variables leads to the independence of indicators. The scaling of observed variables in the development of tests in psychology is based on this property. Latent variables are isolated using mathematical statistics methods. When using the factor analysis, latent variables are called factors.

We called the first factor (30% variance) "Positive mental state", as it recreates positive manifestations in the mental well-being of the population. It includes variables that reflect enjoying life and the absence of negative mental conditions, namely: anxiety, worry, loneliness, and depression. This factor also includes variables that characterize the processes of maintaining a positive attitude and the ability to act in critical and stressful situations – "summoning up enough energy" and "quickly returning to a normal state"[5]. Positive values of the first factor indicate social adaptation.

We identified the second factor (10% variance) as "High self-esteem and agency", because it includes a good attitude toward one's own self, self-confidence and independence of vital decisions one takes. This latent variable includes reliance on optimism and the value of one's activities in the eyes of other people. At the same time, the individual regards themselves not as a narrow specialist who shows results in one area, but believes that they are strong enough in many areas. In our opinion, the factor reflects the subjective position, because important life decisions are made independently, therefore, at the same time this position is a reflection of the internal locus of control. Social subjectivity combined with high self-esteem is the basis for adaptation of the individual, thus the second factor indicates internal adaptation resources.

The third factor (8.5% of variance) indicates social support. It includes variables that reflect the help of loved ones; moreover this help is mutual: the respondent helps their loved ones and vice versa. The openly expressed support is complemented by its other component – moral support, namely the assurance that the respondent is valued by their loved ones. The third factor reflects the external resources of the individual.

The combination of variables in the fourth factor (7.5% variance) is quite interesting. It indicates the ease of making important life decisions and a quick return to a normal state when something goes wrong (the variable "it takes a long time to get back to a normal state" adds negative load to the factor). The vision of life, combined with rapid decision-making, helps to return quickly to a normal state and not feel like a loser. However, a clear idea of the direction in which life is moving is combined with a high assessment of what is happening in life in terms of luck. And this generally gives the factor a slight touch of externality. It is possible that decisions in problem situations are made easily, based on external attitudes (for example, "I'm always lucky", "good luck is on my side"). With this interpretation we can raise a question concerning weak subjectivity and alleged problems with adaptation. In order to make final conclusions it is necessary to look at the combination of the fourth factor with the second and third ones. Then we will be able to talk more confidently about the strategies to overcome the problematic (crisis, stress) situations. We call the fourth factor "Behavior in a changing environment".

Each latent variable can be considered as a scale when making a multidimensional methodology for studying adaptation. The internal reliability of each of the four selected scales (factors) was checked in the SPSS program. The values of Cronbach's alpha[6] coefficients determined in the analysis were greater than 0.7, indicating a high internal consistency of the variables that make up the scales.

[5] Negative load for the variable "d19 – I come back to a normal state slowly".

[6] Cronbach's alpha coefficient is a reliability estimate based on the correlation between the variables in a given population.

Differentiation of Russia's population in terms of social adaptation

Next, the clustering of the four components identified earlier in the process of factor analysis was carried out by the K-means method. Based on the number of components and the sample size, a fast cluster analysis with sequentially given four, five and six clusters was performed. Having studied their content, we decided to focus on six clusters.

Table 3 shows the average values of the normalized variables for each cluster, which determine their final centers.

The greatest contribution to the formation of the first cluster is made by the latent variable "Social support" with a negative indicator; this fact shows that members of this group have no support from their loved ones. The average values of positive indicators for the first and second factors indicate a that respondents have a good mental state that is based on internal support – high self-esteem. The first cluster, which we have designated as "Social adaptation on internal resources", includes 16% of respondents.

The second cluster can be described as "Social maladjustment when resources are available". We can say that this is maladjustment because there are manifestations of negative mental states like depression, anxiety, anxiety, feeling lonely. But it is interesting that the second cluster includes respondents with internal and external resources: internal resources are expressed in the form of self-assessment above the average level and external – in the form of social support. Although the combination of poor mental health with self-esteem above the average level may signal the inadequate nature of the latter, i.e. this is not just a high self-esteem, but an inflated one, which is a risk factor for maladjustment behavior [21, p. 382]. One tenth of respondents (10%) belong to the second cluster, i.e. one in ten residents of Russia, when internal and external resources are available, experiences manifestations of negative mental states.

The third cluster was called "Potential social maladjustment" amid increasing external load. Representatives of this group are characterized by a normal mental state, without strongly manifested symptoms of depression, anxiety, etc. They possess internal and external resources, but the resources are insufficient, since the implementation of adaptation potential is difficult. We assume the presence of the latter circumstance on the basis of the fact that representatives of the third cluster get back to their normal state and find it difficult to make decisions when their living conditions are changing. It is possible that the actual positive mental state is associated with the absence of negative effects, and if stress situations happen, then mental health of representatives of the third cluster (which includes 15% of respondents) may deteriorate, which puts them into the risk group.

Table 3. Clusters of Russia's population that differ in the indicators of social adaptation

Factor (latent variable)	Final centers of clusters					
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Factor 1 "Positive mental state"	0.25	-1.69	0.10	-0.96	0.21	0.83
Factor 2 "High self-esteem and agency"	0.41	0.42	0.43	-1.27	0.60	-0.84
Factor 3 "Social support"	-1.37	0.39	0.43	-0.61	0.46	0.34
Factor 4 "Behavior in a changing environment"	0.02	-0.01	-1.34	-0.02	0.84	-0.03
Size of the clusters: – people	325	201	306	237	505	421
– %	16	10	15	12	26	21
Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/						

Respondents belonging to the fourth cluster give negative subjective assessments of their mental state and note the lack of resources, so we have designated it as "Social maladjustment in the absence of resources". Representatives of Russia's population included in this group are characterized by low self-esteem (it is the lowest among all the groups) and levels of social support. The fourth group includes 12% of respondents, i.e. every ninth resident of Russia does not have sufficient psychological resources to overcome stress when negative external influences are increasing.

The fifth cluster has the following specific feature: positive values of indicators for all four factors, with two of them hainge maximum values: "High self-esteem and agency" and "Behavior in a changing environment". Respondents included in this group (one in four valid respondents – 26%), have a good mental state based on internal and external resources. A distinctive feature of the cluster is a high level of adaptation to the changing reality and the presence of a time perspective, namely: members of the group easily make decisions on vital problems, quickly get back to a normal state in critical situations and also clearly imagine the direction in which their lives are moving. At the same time, these respondents have significant social support. This cluster is called "Social adaptation in highly stressful situations".

The sixth cluster was formed around the first three factors. The persons included in this cluster have a good mental state, which they estimate with the highest subjective assessments compared to other groups. But there is one point here: this state is based only on external resources in the form of social support. As for internal resources, they are absent, as evidenced by the low values of the factor reflecting the impact of self-assessment and agency. We called this cluster "Possible maladjustment in case of the loss of external resources". However, here a question arises that needs to be clarified. Why do we define the state of respondents from the first cluster as adaptation and from the sixth cluster – as problems with adaptation and "possible maladjustment", although the manifestations of mental states in the sixth cluster are better? It is all about resources: they are internal in the first cluster and external in the sixth cluster. When external support is lost, then the mental state can change for the worse, while internal resources for coping with the problem situation are absent.

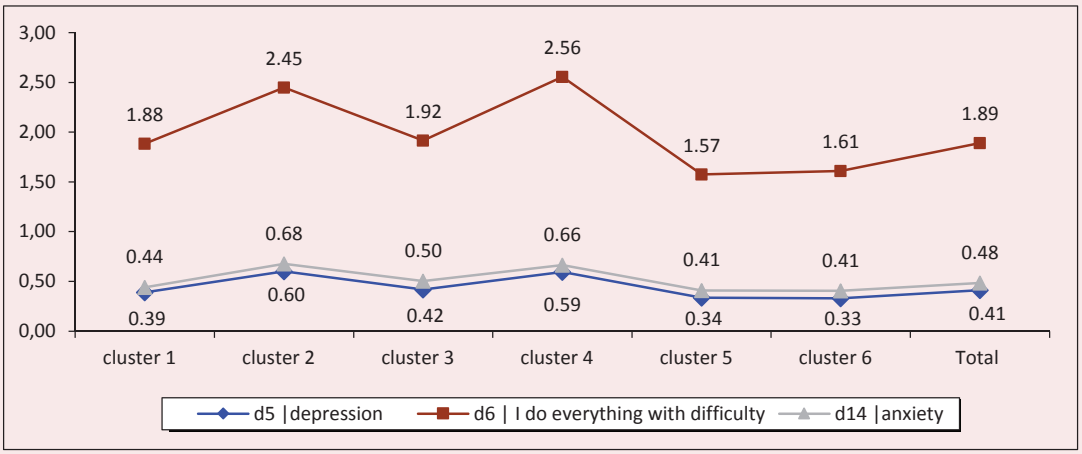
To answer the question whether the differentiation of variables by clusters is significant, a one-factor analysis of variance was carried out, which showed the presence of a significant difference between clusters.

During the cluster analysis, we identified six groups that differ in the degree of social adaptation. We classified two of them as groups of persons with adaptation (the first cluster "Adaptation on internal resources" and the fifth cluster "Adaptation in highly stressful situations"), two – with maladjustment (the second cluster "Maladjustment when resources are available" and the fourth cluster "Maladjustment in the absence of resources"). We also identified two groups with adaptation issues (the third cluster "Potential exclusion under increasing load" sixth cluster "Possible exclusion under the loss of external resources").

Criteria and resources of social adaptation of Russians in the context of groups

To identify the problems of representatives of the third and sixth clusters, we conducted a comparative analysis of various indicators of adaptedness: mental states of different orientation, self-esteem, social behavior patterns, involvement in production activities. Let us just say that the indicators for the fifth cluster are fully consistent with the state of

Figure 1. Values of the variables describing negative mental states, broken down by allocated clusters of respondents, the average score



Source: own calculations using ESS data. Available at: http://www.ess-ru.ru/

adaptation, so we have not included them in the description, but they are present on the graphs for comparison.

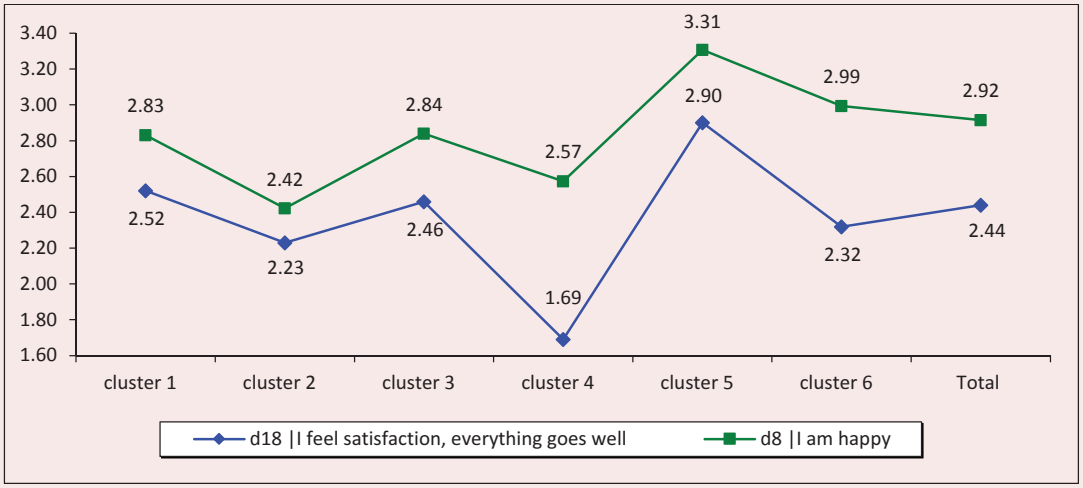
We monitored negative manifestations of mental states by the indicators of depression and anxiety determined in the course of the factor analysis, and by a variable that reflects the feeling that one finds it difficult to do anything *(Fig. 1)*. In addition to more frequent assessments of the presence of depressive and alarming states for the second and fourth clusters, we note high subjective assessments of the presence of difficulties in the representatives of the second cluster, and higher assessments (compared to the data for the fifth cluster – "adaptation") – in respondents from the first and third groups.

We compared the manifestations of positive mental states by additional variables – "Almost every day I feel satisfaction that everything goes well" and "I am happy(a)" (maximum score – 4; *Fig. 2*). The group of maladjusted respondents (the fourth cluster) shows the lowest satisfaction and happiness scores among the entire sample. The people in the sixth cluster have an interesting situation: they feel happy and at the same time cannot say that they get satisfaction from the fact that everything turns out fine. If the reason for this situation consisted in poor performance results, the evaluation of which is important for respondents, then the level of happiness would not be so high. A more appropriate explanation, in our view, lies in the fact is that respondents in the sixth cluster do not find the results of their activities so important that their lack of satisfaction could affect their experience of happiness.

Let us now look at the relationship between self-esteem (the variable "I think well of myself"), the manifestations of agency (the variable "I decide on my own how I should live") and the subjective assessment of one's social status[7]. We see that, first, a good attitude toward one's own self is associated with their independent adoption of vital decisions *(Fig. 3)*. Therefore, the representatives of the

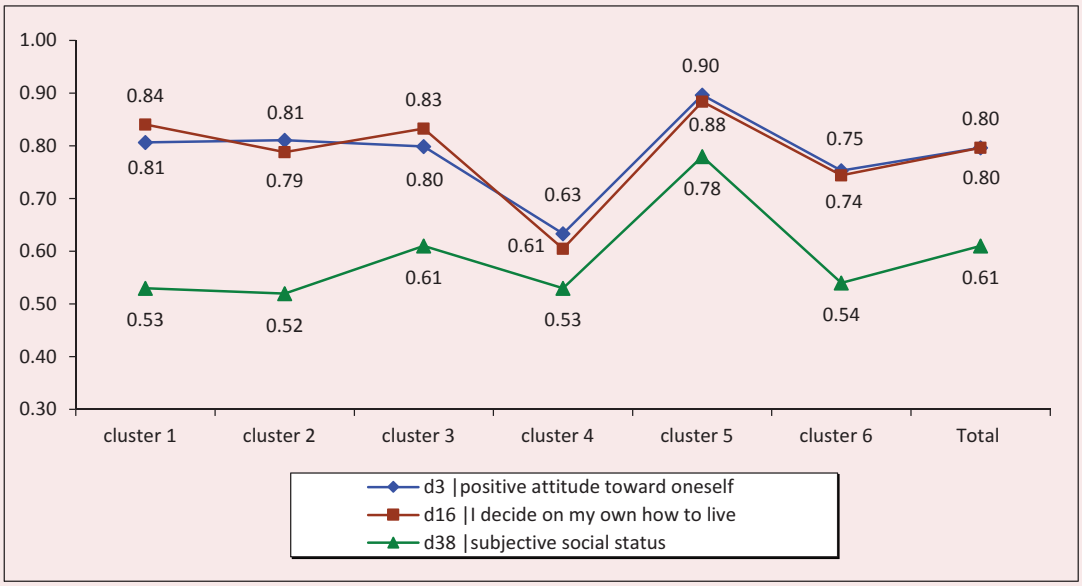
[7] Subjective assessment of social status was put on a scale from 0 to 10 points as an answer to the question: "In our society there are people who are closer to the top of society, and there are people who are closer to its bottom. Where would you place yourself on this scale at the present time?"

Figure 2. Values of the variables that characterize positive mental states, in the context of the allocated clusters of respondents, average score



Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/

Figure 3. Values of the variables characterizing self-esteem, in the context of the allocated clusters of respondents, average score



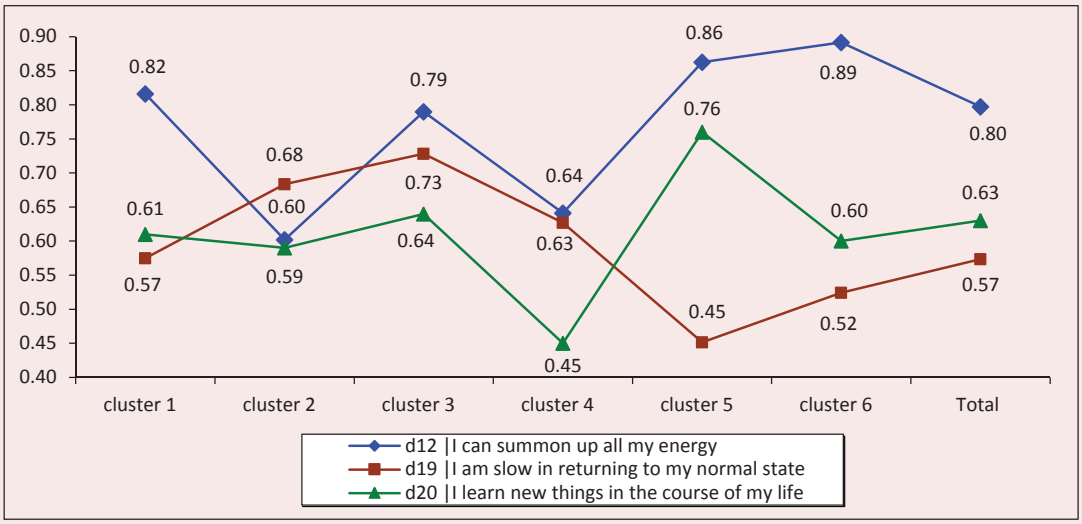
Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/

sixth cluster have low scores on both points. If about a quarter of respondents in the first, second and third clusters absolutely agree with the statement "I think well of myself", then in the fifth cluster – more than half think so, and in the sixth – only 11%. We observe a similar picture with the assessment of agency: 13% of respondents from the sixth cluster, more than 50% – from the fifth, and more than one third – from the first, second and third clusters express absolute agreement on independent decision-making of vital issues.

For the respondents of all clusters, except the fifth one, we should note a low subjective social status. Maybe this is due to the fact that the clusters include representatives of different social classes and groups? In the sixth cluster, along with representatives of the working class (45%), there is a high proportion of employees, white-collar workers (20%). For comparison, the fifth cluster includes 44% of top managers, 41% – of business representatives. This sector also includes one third of respondents who do not have financial difficulties (32%). Even though representatives of the fourth cluster give quite high estimates of their social status (they are at the same level with the estimates of respondents from the first, second and sixth clusters), this group is characterized by low self-esteem and lack of independence with regard to making vital decisions.

Figure 4 presents data characterizing the specifics of social behavior of the representatives of the allocated groups under the changing external environment and an increase in its burden. Representatives of the first cluster assess their ability to adapt as average, but they point out that, if necessary, they can summon up all their internal resources and pull themselves together. The problem of that part of the population, which belongs to the third cluster, lies in the slow pace of adaptation to a changing environment. Respondents in the sixth cluster easily mobilize their energy and get back to a normal state quickly, if necessary; but they have little interest in changing or learning something new, i.e. they have low innovative potential compared to those from the fifth and third clusters. Individuals in the fourth group are slow to recover and are often unable to mobilize their energy; they are not inclined to acquire new knowledge and skills. Representatives of the second cluster more often than others note the inability to mobilize their energy, which is combined with negative mental states (see Fig. 1); at the same time, they quickly return to a normal state. It is possible that the response of this group

Figure 4. Values of the variables characterizing the processes of adaptation to the changing conditions, in the context of the allocated clusters of respondents, average score



Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/

to stressful situations is acute and short, but even if they have the necessary resources, they find it difficult to take steps to remedy the situation.

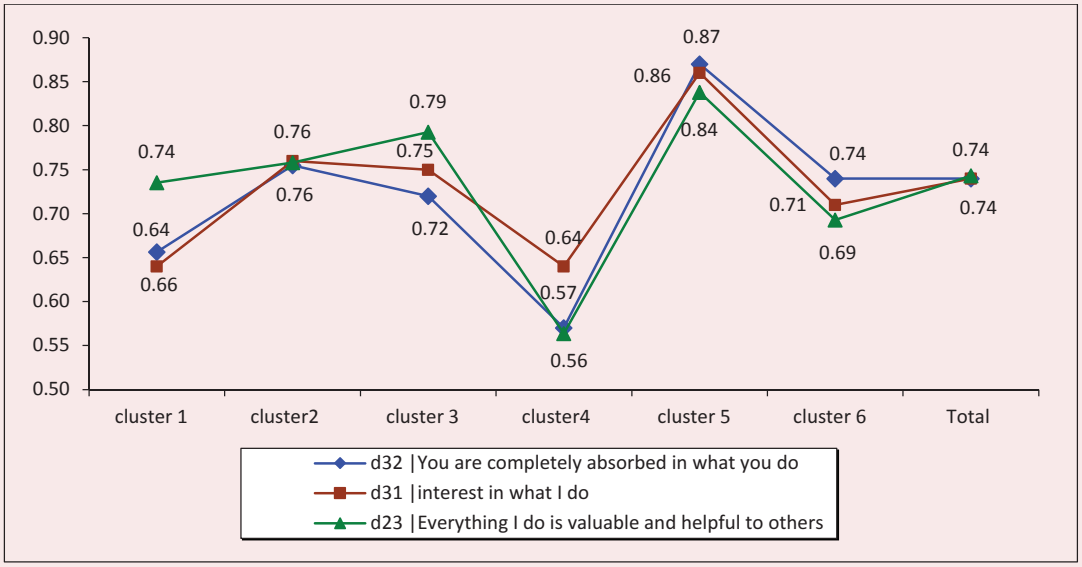
Summarizing the data obtained, we can conclude that the representatives of the third and sixth clusters demonstrate sufficiently high rates of adaptability (both for their mental state and behavioral practices). But this adaptation state is relevant at the time of the survey, and we cannot predict the results of the adaptation process with an increase in the external load on the third cluster, because its representatives are characterized by a slow return to a normal state, and high loads can upset their routine. The result of adaptation for representatives of the sixth cluster is unclear as well, if they are deprived of external support, since they have low internal adaptation resources. According to the conservation of resources theory by S. Hobfoll, the loss of both internal and external resources leads to a decrease in subjective well-being and is perceived as a situation of stress, which ultimately adversely affects the mental health of the individual [25].

Analyzing social adaptation of Russians from the point of view of the subject-activity approach

In order to reveal the contribution of the subject-activity approach to the assessment of social adaptation, we relied on the principle of personal involvement in social relations, manifested in joint activities and communication. For example, we studied the attitude of respondents toward their own work – one of the main types of human activity: how much they are interested in it, whether they consider it valuable and necessary for others, whether they can have an impact on their daily work and on the work of the entire organization/enterprise *(Fig. 5 and 6)*. Thus, we wanted to identify the situation of representatives of different groups in terms of adaptation in the continuum "involvement in labor activity" – "alienation of labor".

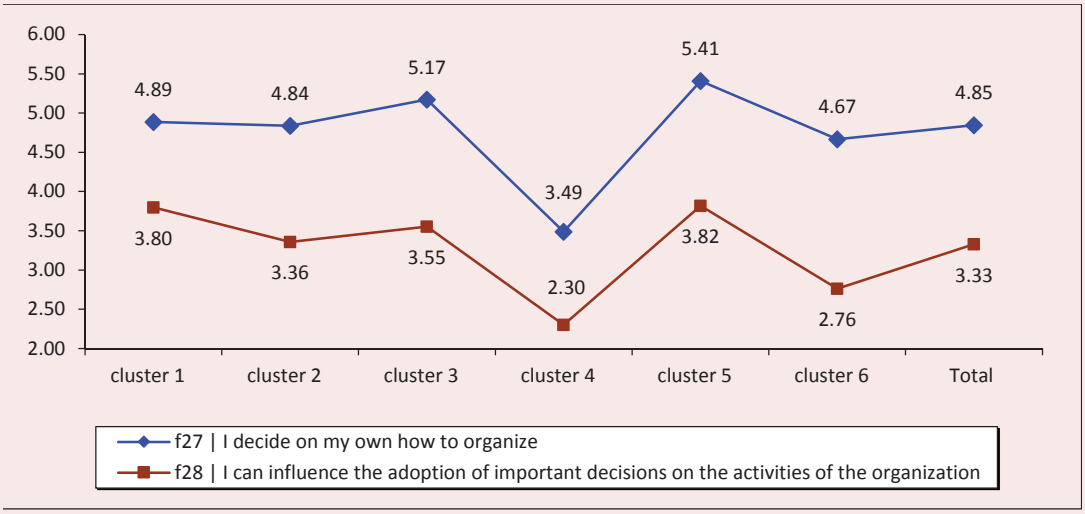
As can be seen, the persons belonging to the first cluster show little interest in their work.

Figure 5. Subjective estimates of one's own production activities in the context of the allocated clusters of respondents, average score



Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/

Figure 6. Subjective estimates of impact resources on the allocated clusters of respondents, average score



Source: calculated with the use of ESS data. Available at: http://www.ess-ru.ru/

They just do not find the time to do what they like. But at the same time they can influence the organization of their daily work and even influence the most important decisions about the activities of the entire organization/enterprise. In general, representatives of the first cluster have a low level of interest in their work and the feeling that they do everything with great difficulty. However, this fact does not affect their self-esteem; the group has sufficient internal resources and is characterized by good mental health.

Representatives of the third cluster, as well as the first, consider their activities more necessary to others than interesting, and they have sufficient resources to influence the organization of activities. Persons belonging to this group also have a feeling that they do everything with great difficulty, and it is superimposed on the difficulty of returning to a normal state under adverse effects. Weak internal resources are combined with low resource impact on the organization of work and with doubts about the value of the work they do.

Respondents from the sixth group sometimes doubt the usefulness and value of their business. However, the low resource impact is a serious problem for them. They are often unable to make their own decisions about their day-to-day work and influence the activities of the entire organization/enterprise. We characterized the whole complex of symptoms as "alienation of labor" in the sixth cluster.

So, as for the sphere of industrial activity, here we should agree with M.A. Shabanova who says that for the representatives of the majority of clusters (the second, third, fourth and sixth) "independent social actions and states in general so far in most cases..." are outside the sphere of industrial activity [26, p. 100].

Discussion

Since the main current challenges are economic, it would be interesting to compare the results of the study of adaptation strategies in situations of financial stress. Some people perceive financial problems as a challenge and mobilize their resources to solve them (changes the usual patterns of spending,

looks for other sources of income), others consider such situations as uncontrollable [27]. In our study, representatives of the third cluster adhere to the second strategy. Here we can draw a parallel with the data of S.V. Mareeva on the socio-economic adaptation of Russians, according to which 15% of Russians do not take any action to improve their financial situation, because they believe that they cannot do anything themselves to get out of the difficult situation [9, p. 69].

The obtained data on adaptation resources are consistent with the results of other empirical studies, which show the predominance of the social resource for Russians in the modern conditions [8, p. 48; 28]. Foreign researchers also found that just an idea of the possibility of obtaining support if necessary can help cope with many stressful situations. The perception of the presence of social support not only reduces negative experiences, but also in some cases motivates to independent efforts to overcome difficulties [29]. However, the impact of the variable "Social support" can be twofold. For example, in old age, the negative effects of economic stress are contained or compensated by the expected support, but the support received exacerbates the impact of financial stress on the symptoms of depression [30].

Psychological resources play a significant role in adaptation along with economic, human and social capital [31]. Effective coping strategies to overcome economic stress caused by dismissal and job-hunting are associated with the following types of actions: increasing self-efficacy, obtaining social support, setting goals and developing new skills [32]. According to foreign research, self-efficacy has the greatest protective potential in situations of economic stress or financial stress from personal resources [33; 34]. At the same time, psychological resources characterize human activity, and are not a set of personal traits [31]. In general, people who use all resources (psychological, social, financial) have the greater resistance to crises [35; 36].

In order to carry out further work on the creation of sociological tools, we find it interesting to consider different experience of building such techniques. For example, P.S. Kuznetsov, interpreting adaptation as the process of establishing a correlation between the needs of the individual and the level of their satisfaction in his methodology offers both the calculation of indices and the definition of the level and profile of adaptation [37].

Summary

Thus, empirical data confirm the theoretical calculations of indicators of social adaptation. As a result of the factor analysis, we identified four latent variables describing the resources and the result of the adaptation process. Two variables reflect the adaptability of the individual: positive mental health and active behavioral practices in a changing environment (subjective activity). The other two latent variables summarize the characteristics of adaptive resources of the individual: internal (high self-esteem, subjectivity, internal locus of control) and external (social support). Thus, the first hypothesis was confirmed by the analysis of empirical data.

The hypothesis of the dependence of differentiation on the level of adaptation on the differences in adaptive resources and on the actual load of the environment has been also confirmed. Groups consisting of adapted and maladjusted persons are clearly distinguished, and adapted persons retain their status in the current and forecasted situation. We have identified groups that are problematic in terms of the dynamics of adaptation processes in the case of changes in the initial data: an increase

in external load or a decrease in social support. Therefore, despite the high actual rates of adaptation of representatives of se groups, we attributed them to the category of "potentially maladjusted". The latent-structural analysis has allowed us to identify the grounds for stratification of Russian society according to the criterion of social adaptation.

The novelty of the work lies in the implementation of an interdisciplinary approach to the study of social adaptation. The latent variables obtained in the course of the factor analysis can be used as scales in the creation of a methodology for the study of social adaptation on the basis of subjective estimates of the population.

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Social Impact Assessment as a Tool for Sustainable Development of the Russian Arctic

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Abstract. In the context of dynamic economic development of the Arctic, one of the strategic tasks is to ensure environmental safety and preserve the conditions and quality of life of the local population. It is possible to solve this problem by conducting environmental impact assessment (EIA) at the stage of economic activity planning, which is mandatory in all Arctic countries. During the EIA process, companies assess possible environmental and related social and economic impact of the planned investment project. For this purpose, appropriate techniques are used, and their number is sufficient to carry out a comprehensive assessment of the impact on the natural environment. At the same time, assessing social impact of economic initiatives is quite a challenge for companies due to the fact that Russia lacks the documents and methodological recommendations that regulate the implementation of such an assessment. This fact is confirmed by the practice of EIA and by scientific research, according to which the assessment of social impact of economic activity is one of the most difficult and least studied issues in modern science. It becomes particularly important to find a solution to this problem for the Russian Arctic, where the indigenous population lives, whose conditions and quality of life largely depend on the state of the environment and preservation of traditional economic activities. In this regard, we set a goal to find an approach to the development of a methodology for forecasting social changes for the Arctic region of Russia. To achieve the goal, we do the following 1) we analyze the existing methodological approaches to assessing the social impact of the planned economic activity in the context of Russian and foreign research, as well as the practice of EIA; 2) we describe a system of indicators of the social environment of

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the Russian Arctic; 3) we build a matrix of social impact of the planned economic activity. The findings of our study can become the basis for the development of specific techniques, including sectoral methods, to assess social impact of the planned economic activity; these techniques can be used for a comprehensive environmental assessment of the planned economic activity by public and private companies.

Key words: economic activity, impact, social environment, assessment, social impact, indicator, methodology, Russian Arctic.

Introduction

Development of the Arctic is one of the national priorities for many Arctic and non-Arctic countries [1, p. 10]. Mining, development of oil and gas fields, development of energy and transport infrastructure – all this can make the Arctic region one of the most attractive territories for investment and implementation of large business projects. According to the Arctic Business Forum held annually in the Finnish city of Rovaniemi, the volume of international investment in projects in the Arctic will be 49.7 billion EUR in 2016–2020 alone; most of the money will go to the development of transport infrastructure, as well as projects in the mining and oil industries [2, p. 73].

Due to the presence of hydrocarbon reserves, availability of infrastructure facilities as well as logistics capabilities of the Northern Sea Route, Russia is the undisputed leader in the development of the Arctic [1, p. 5]. At the same time, it is obvious that the economic development of the Arctic will increase the level of anthropogenic impact on the environment and can significantly affect the conditions and quality of life of the local population. Despite the obvious economic potential of the Russian Arctic, the number of people permanently residing in the region is decreasing every year; this fact is confirmed by negative migration dynamics [3, pp. 51-57]. The main causes of population decline are dissatisfaction with the standard of living and quality of life, as well as poor ecology. Preserving the traditional way of life of indigenous peoples of the Arctic is an equally serious problem [4, pp. 26-27]. Industrial development of natural resources is often accompanied by the alienation of territories used by local communities [5, p. 96] for traditional economic activities; and pollutants entering the environment as a result of industrial activities pose a serious threat to the health of the local and especially indigenous population of the Arctic, whose lives still depend on hunting, fishing, reindeer husbandry and plant harvesting [6, pp. 4-13].

In this regard, it is urgent to develop specific ways to prevent negative environmental and social implications arising due to the development of the Arctic. It is possible to solve this problem, on the one hand, by introducing new or improving the existing methods of forecasting risks to the natural and social environment, and on the other hand, by developing specific technologies aimed to ensure environmental safety of economic activity and improve the quality of life of the population in the Arctic.

Environmental impact assessment (EIA) is one of the tools to prevent negative consequences of economic activity. EIA is carried out by companies at the stage of investment planning in order to make an environmentally friendly decision on the implementation of a project, choosing alternative options or deciding against its implementation.

In Russia, EIA is carried out for any economic activity that has a direct or indirect impact on the environment[1]. The legal obligation to carry out EIA was established on May 16, 2000, when Order No. 372 of the State Committee on Environmental Protection of the Russian Federation approved the Regulations on environmental impact assessment in the Russian Federation. In 1991, Russia signed the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, Finland, 1991); this fact contributed to the emergence of a national EIA procedure. And although Russia did not ratify this Convention, many of its provisions were taken as a basis for the development of the Russian EIA procedure.

According to its content, EIA is the process of determining possible types of negative impact on the environment, which includes assessing the impact of economic activity on natural components: the atmosphere, water environment, land, soil, flora and fauna, as well as forecasting social and economic implications. When carrying out environmental assessment, companies are guided by legislative and subordinate acts, state standards, technical regulations, manuals and instructions, the number of which is currently enough to conduct a comprehensive assessment of environmental impact. At the same time, assessing social implications of the planned economic activity presents a great difficulty for companies due to the lack of regulatory documents and methodological recommendations regulating its implementation in Russia. The absence of a national procedure for assessing the impact on the social environment and the related impossibility of an objective and comprehensive analysis of social impact of economic activities compromise the effectiveness of EIA as a whole and make it necessary to consider social impact assessment as a scientific, theoretical and applied problem.

Review of the literature and methodological approaches to social impact assessment

Barrow [7] was the first to consider social impact assessment criteria for EIA process; Vanclay [8] and Becker [9] further developed its conceptual understanding. According to the scientists, social impact assessment is often reduced to the consideration of the implications of economic activity for human health, but this is not entirely accurate. Social impact assessment is much broader in its content and should include all aspects related to the individual, their existence and quality of life. These aspects include not only health, but also infrastructure, education, culture, living conditions and people's rights. In addition, social impact assessment should reflect the specifics of the territory; this fact is especially important in the conditions of active economic development of the Arctic.

In the practice of assessing the social impact of planned activities, international companies rely on the concept proposed by the International Association for Impact Assessment (IAIA) and the recommendations described in the procedures of the World Bank and the European Bank for Reconstruction and Development. According to the IAIA, social impact assessment is defined as "the process of analysis, monitoring and management of direct and indirect social implications of planned impacts (programs, plans, projects), as well as any processes of social change that may arise as a result of these impacts" [10]. In our opinion, the above definition contains a number of logical shortcomings. First, the economic impact on the social environment

[1] On environmental protection: Federal Law 7-FZ of January 10, 2002. Retrived from the information and legal system "ConsultantPlus".

can have both positive and negative effects. In this regard, it is necessary to clarify what kinds of impact should be analyzed in the process of social impact assessment. Second, economic activities can affect the current state of the social environment and have consequences in the future, so it is important to indicate whether the social impact is to be assessed in the short or long term. Third, in addition to the inhabitants of the territory in which the project is planned, economic activities can have an impact on the population of the surrounding areas, so it is equally important to take into account the transboundary impact of the planned activities in analyzing social impact.

The exensive practice of social impact assessment in the activities of the World Bank and the European Bank for Reconstruction and Development also does not provide a convincing answer to the question of criteria and methodology for social impact assessment. In 2014, the World Bank issued a framework document on environmental and social issues, containing basic principles and standards, compliance with which should contribute to sustainable socio-economic development in the given territories. This document establishes requirements, the implementation of which is mandatory for the World Bank to make a decision on the financing of investment projects. These requirements are aimed at prevention, minimization, reduction or mitigation of negative social and environmental risks and consequences of projects [11]. Major social risks of investment projects are as follows: negative impact on human health, threat to public safety, impact on traditional habitats and biodiversity, depletion of natural resources, change in the traditional way of life of indigenous peoples, demolition or destruction of monuments of spiritual and material culture [11]. The World Bank has developed appropriate standards for each of these impacts; the observance of these standards is mandatory for obtaining financing for the implementation of economic activities.

Indeed, these criteria are important for making a socially oriented management decision on the implementation of an investment project, but they are universal and do not take into account sectoral and regional specifics. In addition, these requirements apply only to those projects for which funding is requested from the World Bank, and do not apply to all others. This fact is confirmed by the projects of the Russian companies Sakhalin Energy[2] and Yamal LNG[3], which in cooperation with foreign partners are implementing large-scale investment projects in the field of oil and gas production in the Russian Arctic. The development of projects is carried out by these companies in accordance with the requirements of international standards to ensure environmental and social sustainability of the territories of presence[4] and involves the mandatory assessment of social risks, the development of a methodology for assessing the impact on the social environment, measures to inform stakeholders and the public, ensuring effective interaction and dialogue with the population, as well as the allocation of significant funds for social investment to address urgent issues and improve the quality of life. At the same time, in Sweden, where EIA is also mandatory, the assessment of the impact of the planned project on the local population

[2] Sustainable development policy. Sakhalin Energy Investment Company Ltd. 2016. Pp. 6-9. Available at: http://www.sakhalinenergy.ru/media/library/ru/policies/SD_POLICY_2016.pdf (accessed: 29.10.2018).

[3] Environmental and social impact assessment. "Yamal LNG". Available at: http://yamallng.ru/upload/ESIA%20RUS%20.pdf (accessed: 21.11.2018).

[4] Environmental and social sustainability performance standards. Available at: https://www.ifc.org/wps/wcm/connect/cd44c6004b8bbc068dbccfbbd578891b/PS_Russian_2012_Full-Document.pdf?MOD=AJPERES (accessed: 08.11.2018).

is reduced to the analysis of implications for public health, and a financial compensation mechanism is used to compensate for the damage caused by companies to indigenous minorities [12, p. 69].

In Russian scientific literature, the concept of social impact assessment was also not subjected to a thorough scientific and theoretical analysis and therefore does not have a clear definition. This is largely due to the historical development of environmental legislation and environmental impact assessment in the USSR and modern Russia. In the Soviet era, environmental protection included environmental management and prevention of negative impacts on the nature, but did not involve the assessment of social consequences of such impacts[5]. In modern Russia, it has become clear that social impact assessment is important for the creation of favorable conditions and preservation of the quality of life of local population. As a result, the term "environment" was subjected to critical rethinking. With the adoption of the Constitution of the Russian Federation in 1993, the term "environment" was understood as not only a set of components of the natural environment, but also a set of natural and anthropogenic objects. With the expansion of the concept of environment and the inclusion of a social dimension in its content, changes have been made to the process of environmental impact assessment. According to the official instructions currently used by Russian companies in carrying out EIA, social impact assessment is defined as a tool to analyze the current state of the social environment in order to forecast possible social changes, as well as to prevent and reduce possible implications[6]. This definition raises two questions: what indicators of the social environment are assessed when conducting EIA and what methods are used in the the course of EIA? Having analyzed professional sources we see that there is a lack of common approaches to the definition of social environment indicators that should be evaluated in the planning of economic activity. For example, according to the requirements developed in 2012 for carrying out engineering and environmental surveys in construction, the assessment of the social aspect of EIA should include population size, employment, living standards, medical and biological conditions and morbidity[7]. According to other regulations for construction project developers, the forecast of social change, in addition to the above, should take into account regional characteristics, such as the relationship between indigenous peoples, old-timers and newcomers[8].

In practice, social impact assessment is usually carried out within the framework of determining the economic benefits of the planned project for the local population without taking into account territorial, social, cultural and other features of the territory [13]. In this regard, standard indicators of social efficiency of a project are as follows: the number of new jobs, wage level, improvement of the standard of living, etc. All these indicators are calculated values and they have a cost estimate. However, as E.V. Ryabukhina points out, "the benefits

[5] Directions on the composition, development procedure, coordination and approval of design specifications and estimates for the construction of enterprises, buildings and structures: approved by the resolution of Gosstroy of the USSR No. 253 of December 23, 1985. Retrieved from the base of legal and regulatory-technical documentation "Electronic Fund".

[6] *Engineering surveys for construction. Fundamentals. A set of rules: SNiP 11-02-96.* Moscow, 2012.

[7] *Ibidem*.

[8] *Environmental Protection. A Practical Guide for Developers of Construction Projects.* FSUE Center for Scientific and Methodological Support of Engineering Maintenance of Investments in Construction". Moscow, 2006. Pp. 160-163.

of the project are perceived differently by different population strata" [14, p. 85], since, in addition to economic, there are also other criteria for human development [15] that are related to human values. The cost approach to the assessment of social impact does not take into account the types of impact that cannot be calculated, for example, the impact on cultural and spiritual values, the impact on social well-being, which many scientists refer to as "subjective" [16, p. 101] or qualitative evaluation criteria. In addition, in such regions as the Arctic, there are people whose income level is often significantly lower compared to the income level of the rest of the population [17, p. 4], so the economic benefit from the planned project cannot be a key factor when deciding on the implementation of the planned economic activity.

Thus, the main question that arises in assessing the social impact of the planned activity is related to the choice of indicators of the social environment, which will be analyzed in the course of the assessment.

In order to answer this question, first of all, let us turn to the definition of the concept of "social environment", which means "a set of spiritual, social, communal, housing and similar conditions in which the individual lives" [18, p. 83]. This definition is based on the consideration of the social environment as the integrity, unity and "co-existence" (M. Heidegger) of its basic elements, namely nature, man and society [19]. Consequently, social impact assessment should include an analysis of the consequences of economic activity for all components of the social environment, and necessarily take into account the social structure and socio-cultural dynamics of the selected region [19]. With this approach, the priority objective in assessing the social impact of the planned economic activity for the regions with so-called vulnerable ecosystems, such as the Arctic, should be to improve the quality of life of permanent residents and indigenous people.

An equally inportant question, which arises when assessing the impact of the planned project on the social environment, concerns a methodology for social impact forecasting. So far, there is no universal methodology for assessing changes in the social environment as a result of the impact of economic activity both for Russia as a whole and for individual social systems, such as the Arctic. This fact is confirmed by research findings, as well as practical manuals for developers of investment projects. One possible reason is that when assessing the impact on the social environment it is difficult to predict how the planned project will affect the health, biophysical state and living conditions of the local population and what social consequences it will have in the future. In this regard, the main methods used by companies in assessing social impact are identical to those used in assessing the impact of the planned project on the components of the nature. These include the method of forecasting by analogy and the expert method [14, p. 106].

The essence of forecasting by analogy lies in the fact that when assessing the impact on the social environment companies compare the planned project with the already implemented projects, find similarities and differences in the types of social impact and, by analogy, make a forecast regarding the possible implications [20, pp. 59-60]. The main disadvantage of this method consists in the fact that it does not take into account the natural and climatic features of the given territories and the living conditions of the local population, which will be affected during the project implementation; as a result, this method can give only a rough picture of the possible social impact.

The method of expert assessments consists in drawing up a list of indicators of the social environment and in establishing the degree of impact (in points) based on individual or collective opinion of specialists (experts) [21, p. 309]. According to E.V. Ryabukhina, the main disadvantage of this method is "the subjectivity of assessments, which is not eliminated by the availability of a large number of expert opinions, since a large number of expert opinions can increase the objectivity of assessments only if individual opinions are independent, which is difficult to achieve in practice" [14, p. 119].

Thus, the analysis of domestic, foreign and professional literature has shown the absence of general scientific and theoretical approaches to assessing the social impact of the planned economic activity; this fact is due to a number of factors. First, modern science has not yet developed a unified assessment theory, which could be used for the analysis of individual projects and programs [22, p. 7]. Second, the social space of the Arctic region has not been studied in detail. Third, most of the methods used to assess the environmental impact of planned economic initiatives are not applicable to the forecast of social change. In this regard, according to some researchers, long-term forecasts of socio-economic development in relation to the Arctic are hardly possible to carry out at the present stage [23, p. 11].

In our opinion, one of the approaches to creating a methodology for assessing social impact in the Arctic can consist in the development of a comprehensive system of social environment indicators [24, p. 17] and their assessment using the matrix method. The use of this technique will allow us to determine the current state of the Arctic social environment, to establish cause-and-effect relationships between its components and impact factors and to make a forecast of possible social changes that may occur in the course of economic activity.

Research methodology and methods

To develop a methodology for social impact assessment in 2014–2016 we conducted a study of existing practices for environmental impact assessment in the European part of the Arctic zone of Russia. Empirical data were collected in the Arkhangelsk and Murmansk oblasts, in the Komi Republic and Nenets Autonomous Okrug via semi-structured interviews with the main participants of EIA process such as business companies that are initiators of economic activities and customers of EIA materials; state authorities at the federal and regional levels responsible for coordinating economic initiatives and issuing permits for the implementation of projects, municipal authorities accompanying the procedures of public hearings of EIA materials; non-profit organizations representing the interests of the public; organizations developing project documentation, as well as experts involved in the state environmental assessment of EIA materials. In addition, the study of EIA practice was conducted in Moscow and Petrozavodsk (Republic of Karelia).

All in all, 51 interviews were conducted. Forty interviews were conducted in the regions of the European part of the Russian Arctic, 35 of them – in person and 5 – by telephone. The analysis of the data revealed that 13 respondents did not have sufficient knowledge and practical experience in the field of forecasting the environmental and social impact of the planned economic activity. As a result, 27 interviews were analyzed, 7 of them – with representatives of federal and regional authorities, 2 – with representatives of municipal authorities, 5 – with heads of business companies, 6 – with representatives of project organizations, and 7 – with non-profit organizations.

The main purpose of the field research was to update the information in the official documents on the criteria and methods of environmental impact assessment and methods of forecasting social impact of the planned economic activity in the Arctic regions of Russia.

The questions that respondents were asked at personal interviews were divided into three thematic groups. The first group of questions concerned the legal regulation of EIA process in general and the assessment of social impact in particular: *"For which economic projects is EIA mandatory?", "What laws and regulations are companies guided by in conducting EIA?", "Is the legal regulation of EIA process different in the Arctic and in other regions of Russia?"*.

The second group included questions concerning methodological and instrumental support for the assessment of environmental and socio-economic impact of the planned activity, namely methods for collecting baseline data, establishing the criteria for determining the degree of impact of the planned project on the components of the natural and social environment, as well as tools for monitoring environmental and social impact in the process of project implementation: *"Are there officially approved methods and criteria for assessing social impact of the planned economic activity?", "Is the traditional knowledge of local communities and indigenous peoples taken into account in assessing social impact and, if so, how is it done?", "What period is the forecast of social impact made for? If the forecast is for 10 or 15 years (for example, in the oil and gas industry), then what tools are used for data collection and what methods are used for long-term forecasts of changes in the social environment? What assumptions about social impact are included in the analysis?"* The third group of questions was aimed at finding out ways of involving the public in the process of assessing environmental and socio-economic impact and using local potential and traditional knowledge of indigenous peoples: *"Do you think that it is mandatory that the population should participate in EIA and that public opinion should be taken into consideration when conducting EIA?", "Are companies interested in disseminating information about the project they are planning to implement?", "What instruments of public participation are implemented in practice?", "How is public opinion reflected in the final materials on EIA?"*.

In the end, respondents were asked to provide examples from personal experience of participation in environmental impact assessment and to provide recommendations for improving the procedure taking into account natural and social characteristics of the Arctic region. In particular, the respondents were asked the following questions: *"What environmental and social issues in the Northern regions deserve special attention during EIA?" and "Do you think that a special EIA procedure should be developed for the Arctic?"*.

In 2017, the study of environmental impact assessment was continued and extended to the Asian part of the Russian Arctic Zone[9]. We collected empirical data with the help of a questionnaire survey of the main participants of EIA process in the Arkhangelsk and Murmansk oblasts, the Komi Republic, the Republic of Sakha (Yakutia), Nenets and Yamalo-Nenets autonomous okrugs. Out of the 92 questionnaires sent to respondents, 26 were filled in. Among them: ten – from federal and regional authorities, eight – from representatives of business companies, seven

[9] The study was conducted on the basis of Lomonosov Northern (Arctic) Federal University under the order of the Ministry of Economic Development of the Russian Federation in the framework of the international project "Recommendations on environmental impact assessment and public participation in the Arctic".

– from project organizations and one – from a non-profit organization that represents the interests of indigenous minorities.

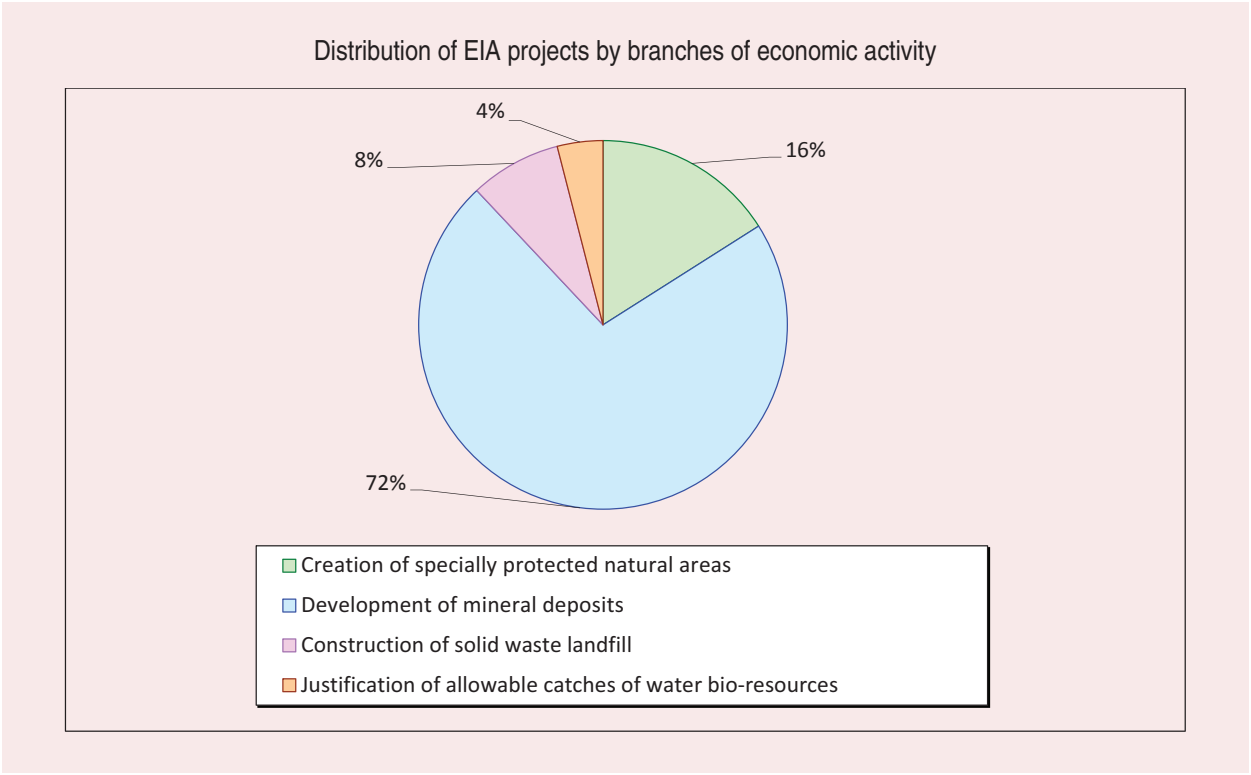
The main purpose of the questionnaire was to study the positive experience of stakeholders' participation in EIA and to collect proposals to improve the current procedure of environmental and social assessment. In total, respondents were asked 12 questions, which were divided into two groups. The first group of questions was aimed at obtaining information on the existing practice of EIA in the Russian Arctic: *"Have you participated in the environmental impact assessment and, if so, then in what capacity: as initiator of the project, developer of project documentation and EIA materials, representative of public authorities or the public?", "If you have, than what was the project (give its short description) and what were your responsibilities?"*.

The second group of questions was about the recommendations for improving the current EIA procedure taking into account the specifics of the Arctic region: *"In your opinion, is there an ideal EIA scheme for the Arctic region today?", "What are the shortcomings of the current EIA procedure and how it can and should be improved?", "What is the role of the public in environmental impact assessment and how, in your opinion, can the importance of public participation in the EIA be enhanced?", "What questions and themes, in your opinion, require special attention when carrying out EIA in the Arctic region?"*.

Research findings

Having analyzed the empirical data, we find out that most of the projects that are implemented in the Arctic Zone of the Russian Federation, for which EIA is carried out, are associated with the development of mineral deposits *(Figure)*.

Taking into account the high environmental risks of the projects under implementation, 93% of respondents noted the importance of



developing a comprehensive assessment of the impact on the natural and social environment of the Arctic region. To do this, it is necessary to restore the key role of EIA in decision-making on the implementation of economic projects in the Arctic, improve the national regulatory framework, conduct comprehensive research on all components of nature and society, taking into account the actual state of the natural and social environment in the area of planned economic activity, develop a detailed plan for environmental protection, introduce the system of state control and monitoring of the environment in the area of economic activity, taking into account the socio-economic and socio-cultural aspects of the territories of presence.

According to respondents, special attention should be paid to the assessment of social impact of the planned economic activity. The system of indicators of the Arctic social environment should include both basic and specific indicators for this territory; the indicators are as follows: the traditional way of life of indigenous peoples, their distinctive social organization, especially cultural and everyday life, spiritual values and traditional crafts. According to respondents, the issues that need to be addressed in the course of EIA in the Arctic include: compensation for environmental damage to indigenous small peoples in the places of their traditional use of natural resources, preservation and prevention of health, preservation and development of traditional culture and languages of indigenous small peoples.

Having analyzed scientific and professional literature and the findings of field studies, we identify quantitative (objective) and qualitative (subjective) criteria for assessing the current state and forecasting the changes in the social environment of the Arctic region of Russia *(Table 1)*.

Quantitative indicators include those criteria that can be given a numerical value [24, p. 104]. Qualitative data can be converted into quantitative data on the basis of a point system; they can be ranked according to the degree of intensity of the influence of impact factors and can be used to make an objective picture of the current state and possible changes in the social environment. To do this, it is advisable to use the matrix method, which is often used to assess the impact of the planned project on the components of the nature. The essence of this method is to establish the relationship between the indicators of the social environment, which will be considered during the evaluation, and the impact factors; it is followed by the construction of the table that indicates the fact of interaction [21, p. 310]. The degree of impact can be determined by the results of sociological research and expressed by means of point scales. As a result, a two-dimensional quantitative impact matrix will be built, which can be used to establish causal relationships between the impact factors and components of the social environment, to obtain expert

Table 1. Criteria for assessing the current state and forecasting the changes in the social environment of the Arctic region of Russia

Quantitative	Qualitative
Demographic indicators and migration processes	Traditional material culture
Employment	Traditional spiritual culture
Income and standard of living	Recreation resources
Accessibility of education	Right to engage in traditional crafts
Public health and safety	Social well-being

knowledge about its current state and possible changes [21, p. 310], to develop alternative options for the implementation of the project, as well as measures to mitigate or prevent negative implications for society.

The disadvantage of the proposed method lies in the fact that it does not provide sufficiently objective criteria for making management decisions and cannot be used in the monitoring of impacts [14, p. 111] *(Table 2)*.

Table 2. Matrix of the impact of the investment project on the social environment of the Arctic region

Social environment indicators	Impact factors	Degree of impact (point score)
Employment	Creation and provision of new jobs to all, including the indigenous population.	X
	Reducing unemployment.	X
Income and living standards	Raising income and wages.	X
	Promoting social mobility.	X
	Aggravation of social stratification by income level.	X
	Changes in the prices of goods and services.	X
	Construction and commissioning of new housing.	X
	Changing the level of housing prices.	X
	Increase in the demand for local goods and services, as well as the purchase of traditional craftwork items from indigenous communities.	X
	Development of local business	X
	Modernization and construction of social infrastructure objects.	X
Population migration	Increase in the number of labour migrants.	X
	Necessity to resettle local and indigenous population.	X
Demographic situation	Population growth and changes in its composition due to the increase in the number of migrant workers.	X
Education	Increase in the number of educational institutions and organizations providing educational services.	X
	Improving the availability, level and quality of educational services.	X
	Creating favorable conditions for obtaining general, professional and additional professional education, for professional development and retraining of local and indigenous population.	X
Public health	Increase in morbidity due to environmental pollution.	X
	Rising incidence of mental diseases due to the violation of traditional way of life.	X
	Construction of new and modernization of existing healthcare facilities.	X
	Improving the quality of medical services.	X
	Improving access to healthcare for local and indigenous population.	X
Public safety	Growing number of social and intercultural conflicts between indigenous and local population and labor migrants.	X
	Increase in the number of accidents caused by the construction and operation of infrastructure.	X
	Increase in crime rate.	X
Spiritual and cultural values	Damage to or loss of objects of spiritual, cultural, and cultural-and-historical heritage.	X
	Restriction or violation of access to objects of spiritual, cultural, and cultural-and-historical heritage.	X
	Violation of the original and traditional way of life, including the inability to implement traditional customs, perfom rituals and religious rites.	X
	Loss of indigenous languages.	X
Recreation resources	Restriction or termination of access to traditional recreation and tourism areas.	X

End of Table 2.

Social environment indicators	Impact factors	Degree of impact (point score)
Traditional crafts	Seizure and segmentation of lands of indigenous peoples.	X
	Reducing fish stocks and limiting opportunities for traditional and recreational fishing.	X
	Restriction of access to the places of gathering of wild plants.	X
	Restriction of access to hunting places.	
	Changing nomadic routes and feeding places for deer.	X
Social well-being	Increase in the level of social tension.	X
	Issues related to social adaptation of local and indigenous population to new socio-economic conditions.	X
	Increase in the level of concern and distrust among the population.	X

Discussion of results and conclusions

We have considered the aspects of the current assessment of the impact of the planned economic activity on the social environment, and they indicate that comprehensive studies of this problem are relevant both in scientific and theoretical and practical terms. Scientific analysis, definition of criteria, development of methods for its implementation play an important role in ensuring sustainable social development of territories in the process of economic activity and in preserving the conditions and quality of life. It is of particular importance to find a solution to this problem for the Arctic, the space of which is a complex combination of natural, social, historical, cultural, and spiritual levels of human existence. Consideration of all aspects of human life should be the basis for the development of methodologies and technologies for assessing and forecasting social risks.

The paper shows that traditionally the development of assessment has always gone from practice to theory [22], but no assessment practice can guarantee the safety of the planned activities without comprehensive theoretical studies of the system, which will be affected. This necessitates scientific research on the social structure and social dynamics of the Arctic region, as well as the features of traditional nature management and life [25].

In recent years, both in Russia and abroad, more and more fruitful scientific papers on various social aspects of the Northern and Arctic territories are published; nevertheless the analysis of the results of interviews and questionnaires has shown that determining the indicators of the Arctic social environment is one of the most serious problems in the development of specific methods and technologies for forecasting social impact. One of the ways to solve this problem, in our opinion, is to take into account global and Russian experience in scientific and applied research and involve experts and practitioners from such scientific fields as sociology, anthropology, ethnology, geography, economics and ecology.

The second problem we try to tackle in our paper is related to the development of a methodology for forecasting social impact on the basis of the matrix method, which can be used to assess the current state and forecast possible changes in the social system and which can become the basis for making socially significant decisions on the implementation of the investment project. Despite the existing shortcomings of the proposed methodology, it can be taken as a basis for the development of common approaches and methodologies

for assessing social impact, which in turn can be used by public authorities and companies to develop general recommendations for the sustainable development of the Arctic region, as well as decision-making in the field of environmental protection and preservation of favorable living conditions of the local Arctic population.

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Minimum Wage and the Subsistence Level in the Russian Economy: Theoretical and Empirical Analysis of the Main Trends*

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Abstract. The paper studies the relationship between the minimum wage and the subsistence level in the Russian economy. In particular, we analyze the degree of elaboration of the issue and reveal its aspects that are studied most extensively, less extensively and those aspects that remain debatable. We use a methodology of normative-positive analysis and reveal a causal relationship, according to which the subsistence level should determine the consumer basket and the minimum wage, respectively. However, as we note in our paper, in the current economic practice the specified relationship has the opposite direction as well. We consider the main trends in the change of the subsistence level, the consumption basket and the minimum

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wage at the level of the Russian economy and conclude that their nominal and legally established equality does not promote real simple reproduction of labor force in certain regions. Moreover, the data obtained in the course of empirical analysis show that there is a differentiation in the level of wages between the regions of one type of activity. Scientific novelty of our study consists in the fact that it considers the complete cycle of circulation of the commodity form of the simple labor force, including the receipt of the advanced minimum wage, the minimum disposable income, and the subsistence level. The data on Russia obtained during the analysis show that the minimum wage remains behind the real subsistence level; such a situation impedes the creation of conditions for the simple reproduction of labor force. The results we have obtained can be used to develop regulations at the federal and regional levels, to develop target programs to support rural areas and to study the correlation between the subsistence level and the minimum wage differentiated by sector, region and level of professional training of employees.

Key words: wages, labor remuneration, labor costs, measure of labor remuneration, minimum wage, subsistence level, policy on the minimum wage.

Introduction

Currently, 93.4% of able-bodied citizens in domestic economy are employed[1]. It is obvious that any employee *wants* to be paid a sufficient amount of money for their work in order to have a *proper* life. However, in practice everything is much more diverse and complex than their wish. First, author's observations, research results, published official statistics, expert opinions, etc. suggest that, despite the changes in the increased wages in the country and in separate regions, the relatively low level of wages of employees remains. Second, the differences in current wages in economic practice are largely determined by the specific features of economic activity in the region. For example, in Altai Krai as a region with the agricultural (agro-industrial) profile the share of people receiving wages below minimum level amounted to 6.0% of the total number of employees in 2017. Third, despite the fact that since May 2018, under the current legislation minimum wage (11,163 RUB) has equaled living wage, minimum wage remains relatively low[2].

In world economic literature, the most studied aspect is minimum wage in relation to employment level, competitive labor market, level of labor regulation, consumer prices in the economy, human capital formation, etc. Since these aspects are not directly related to the problem under review, we focus on them from the perspective of general problem review.

Thus, when studying the impact of minimum wage on the level of *employment*, one group of researchers revealed a negative impact on the employment of certain groups of low-paid and low-skilled workers [2]. Another group of researchers revealed the reverse image, which helps determine the positive impact of minimum wage on employment [3, 4]. In particular, the article by S. Bauducco and A. Janiak explores the effects of raising

[1] *Labor force, employment and unemployment in Russia (based on the results of sample labor force surveys).2018:* statistics book. Rosstat. Moscow, 2018. P. 44.

[2] In modern economic literature, such a measure does not meet much optimism among researchers. On the contrary, there are concerns that living wage will not be re-considered in time based on the necessary standard of living of the working-age population [1, p. 88].

minimum wage on macro-economic variables such as employment, capital stock, and wage distribution. The results of the study confirmed previous findings: moderate growth of minimum wage has almost no impact on employment, while it reduces the distribution of wage and creates positive side effects for its increase [5]. D. Cengiz et al. present an approach that studies the impact of minimum wage on employment. The novelty of the presented approach made it possible to assess this impact based on wage distribution [6]. A. Brown, Ch. Merkl, and D. Snower conclude that a sufficiently low minimum wage does not have a negative impact on employment. On the contrary, high minimum wage leads to a reduction in the number of jobs [7]. The study of T. Boeri brings us to a conclusion about the difference in the levels of minimum wage. After studying data for 68 countries for the period from 1981 to 2005, Boeri concluded that minimum wage set by the government is below minimum wage set in collective agreements [8].

The article by D. Lee and E. Saez presents normative analysis of the policy of establishing optimal minimum wage in relation to *the model of competitive labor market* using the standard social security system. In particular, it presents analysis of the optimal minimum wage policy required to build a redistribution mechanism in a highly competitive labor market in two variants: 1) in the presence of taxes/transfers and 2) in their absence. The study concluded that minimum wage is a useful tool if the government has mechanisms to redistribute in favor of low-paid workers [9].

The article by R. Sauer reviews the macroeconomic implications of changes in *the legislation* of minimum wage. According to the assessment from the point of view of the US monetary policy, minimum wage has little impact on macroeconomics. Although detailed calculations demonstrate that a deliberate increase in minimum wage[3] can lead to economic growth [10].

In domestic literature, the study of minimum wage was carried out in conjunction with the *reproduction of labor power, industry and regional characteristics of wage, the wages policy*, etc. In particular, the studies by R. Kapelyushnikov, M.Yu. Neklyudova, T.N. Dolinina, etc. review and justify the need to regulate relations in the field of wages in terms of implementing legally established norms in wages for a particular enterprise [17–19]. Studies on the problems of minimum wage and related aspects in relation to the regional labor market, comparative analysis of foreign and domestic experience in regulating relations in the field of wages are presented in works by N.T. Vishnevskaya, E.N. Soboleva, A.L. Mazin, N.M. Kulagina, E.A. Efimova and many others [20–24]. One of the key aspects in the study of the wage policy is the need to determine minimum wage from the position of guaranteeing an employee an *acceptable* level of reproduction of labor [25–28]. At the same time, the economic significance of using minimum wage in the regulation of relations between an employee and an employer is justified by the importance of the state's participation in determining the standard (lower limit) that can properly meet the needs of an employee and their family members in clothing, food, housing, childbirth and upbringing, etc. [29–30].

[3] Some articles are devoted to the study of the impact of minimum wage on *industry prices* [11], *workers' consumption* [12], *training* [13], *workplace automation* [14–16].

A specific feature of the national school of economists engaged in the study of minimum wage is the fact that it is considered in conjunction with living wage. Most modern studies are focused on considering their ratio mainly in the 2000s. In particular, the study of the ratio of minimum wage and living wage for the working population is carried out in the article by E.N. Soboleva and I.V. Soboleva [31]. The research by V.V. Kookueva the considered methodological aspects are associated with the study of the legislative framework for establishing minimum wage and living wage followed by the assessment of changes in these values [32].

The studies of living wage are connected with the methodology of its determination. This issue was studied in the article by L.S. Rzhanitsyna and I.V. Soboleva, who pay attention to approaches to quantitative determination of living wage using legally established Russian standards in comparison with foreign practice [33].

In the present paper, unlike the considered studies, in addition to studying the current trends in minimum wage, living wage and consumer prices for the period from 1990 to 2017, much attention is paid to the theoretical aspects of the formation of the minimum wage and living wage.

The less studied aspects in the study of the ratio of minimum wage and living wage are: the ratio of positive and standard approach in the study of this connection; the logical correlation between minimum wage, living wage and minimum market basket from the standpoint of circulation of the value of labor goods of labor.

Based on insufficient knowledge of these aspects of the problem, the purpose of the present paper is to study the theoretical foundations and identify trends in the ratio of minimum wage (MW) and living wage (LW). To achieve this goal, we expect to solve the following objectives: to determine the research methodology; to analyze the theoretical and empirical results of the study of minimum wage and living wage; to show their scientific and practical significance in the modern economy.

Research methodology

Legal literature sources have demonstrate that MW and LW from the standpoint of the methodology are in direct logical correlation. Thus, the Labor code of the Russian Federation states that MW is established simultaneously throughout the territory of the Russian Federation by Federal law and *cannot be* lower than LW of the working population[4].

This means that from the logical and methodological point of view, the term "living wage" is a *normative* definition of minimum wage. This is confirmed in the latest version of Federal law on minimum wage, which states that starting from January 1st, 2019 and then annually, from January 1st of each year, minimum wage is established by Federal law in the amount of living wage of the working population as a whole in the Russian Federation[5]. At the same time, Federal law on living wage states that living wage is a cost estimate of consumer basket, which is referred to as a minimum set of food products necessary for human health and ensuring people's life,

[4] *See: Labor Code of the Russian Federation no. 197-FZ* (last updated 11.10.2018), dated 30.12.2001. Available at ConsultantPlus reference system.

[5] *See:* On minimum wage in Russia: Federal law no. 82-FZ, dated 19.06.2000 (last updated 07.03.2018). Available at ConsultantPlus reference system.

as well as non-food goods and services, whose cost is determined in relation to the cost of a minimum set of food products[6].

Thus, it seems to us, from the standpoint of the logic of legislation there is a *positive* deductive triad: consumer basket determines living wage, which, in turn, is a benchmark for establishing minimum wage.

If we look at this triad from the standpoint of minimum wage, we get the opposite *normative* (prescriptive) triad[7]: minimum wage *must* correspond to living wage, and living wage *must* correspond to consumer basket.

The positive aspect, as is known from the methodology of scientific research, is related to the study of what *there is*. With regard to the above-mentioned problem, in fact, the *actual* and available monetary wages in money economy, all other things being equal, *determine* the employees' real standard of living.

The normative aspect, as is also known from the methodology of scientific research, is related to what *there is* (*the actual being*), it must correspond to its ideal concept. For the purpose of the article, minimum wage must always correspond to minimum standard of living of wage-earners.

Theoretical research results

The theoretical study of minimum wage reveals its nature in the framework of both simple commodity-money circulation (i.e. labor markets and consumer goods) and circulation of individual industrial capital, which is set out in K. Marx's "*Capital"*. We believe that the neo-Marxist approach helps consider and analyze the correlation, the transit of minimum wage and living wage "into each other".

According to Marx, the purchase of labor power by the capitalist $M - C_{LP}$ is at the same time the sale of labor power by the worker $C_{LP} - M$ [36]. The worker spends the money, including minimum wage, on purchase of means of consumption, or $M - C_{MC}$ where C_{MC} – a commodity(ies) as a means of consumption.

According to Marx's theory, the circulation of a commodity "labor power" fits *only* into the scheme of *simple* commodity circulation:

$$(C - M - C), \text{ rather than capital circulation} \quad (1)$$

$$M - C - M'. \quad (2)$$

This theoretical vision did not help Marx get the commodity scheme of circulation of production factors, including labor power.

First, according to Marx, the scheme of simple commodity circulation excluding downtime for the circulation of cost of labor power is as follows:

$$C_{LP} - M - C_{MC}, \quad (3)$$

[6] On living wage in Russia: Federal law no. 134-FZ, dated 24.10.1997 (last updated 29.07.2018). Available at ConsultantPlus reference system.

[7] The normative (prescriptive) approach and the positive (descriptive) approach are known to be opposite and mutually exclusive. This was first paid attention to in philosophy and methodology of science by D. Hume, who formulated the principle known as Hume's guillotine [34]. It states that from the standpoint of formal logic it is impossible to move directly from *"is" statements* (descriptive statements), with the subject and the predicate of statement linked by "is", and "should" statements (prescriptive statements), where "should" or *"shouldn't"* is asserted or denied, rather than "is".

One cannot but agree that what Hume himself and his many followers said is obvious from the standpoint of formal logic. But Aristotelian formal logic does not cover all logic. G.W.F. Hegel in his Science of Logic, in particular in his doctrine of essence, speaks not only about the *reality* of essence, its finitude, but also going beyond this finitude towards *infinity*. Such a process, or rather, the desire to go beyond the finitude, is associated with the principle of *ought*, whose nature is not real (finite) , but *ideal* (infinite) essence [35]. Therefore, according to Hegel, the actual ought moment is included in the logic of essence, the "is" logic.

that is, the sale of labor power in order to buy means of consumption. However, in this scheme, the initial and final points do not coincide, which contradicts the form of a circular movement in which the initial and final points must coincide in form and content, i.e., in the lapidary form, the circulation of the commodity of labor power should be as follows: $C_{LP} – M – C_{LP}$, with the end of one cycle being the beginning of the next.

Second, in the labor market small commodity circulation of value of labor power is always associated with a certain kind of downtime, during which the received *wage* of workers become monetary stock (Keynes' liquidity preference) intended for the purchase of means of consumption. Workers do not spend their wage *immediately*, but spend it *in parts* during a certain period of time. With that said, Formula 3 is the following:

$$C_{LP} – M...M – C_{MC}, \quad (4)$$

where points indicate downtime in money expenditure as wages, including its minimum level.

Third, receiving wages is mediated by the process of labor. Wages (the price of labor) acts as *remuneration for labor*, more precisely, as remuneration for the *work* performed. This circumstance helps divide wage into two parts. One part is paid in advance in order to maintain the working capacity of the employee until the end of the labor process. Hypothetically, it should correspond to a certain *constant* value which equals living wage and minimum wage. The other part of the salary must be paid fully, according to the contract, including various benefits and allowances. Hypothetically, this part is *variable*. Considering the above, Formula 4 becomes the following:

$$C_{LP} – M_{PW} ...C_{W}...W – M_{WP} – C_{MC}, \quad (5)$$

where M_{PW} – prepaid wage, $...C_{W}...$ – labor process, W – work performed, M_{WP} – wage for work performed, net of prepaid wage.

Fourth, various taxes and fees are deducted from wage, legal non-labor incomes are added. This point of distribution is indirectly included in the cycle of labor value. Taking into account the point of distribution, Formula 5 becomes the following:

$$C_{LP} – M_{PW}...C^{W}...W – M_{WP} ...M_{PDI} – C_{MC}, \quad (6)$$

where M_{PDI} – personal disposable income, while $M_{PDI} = M_{WP} – T + M_{LNI}$, where T – all taxes and charges, M_{LNI} – legal non-labor income.

Fifth, in order to sell labor power again, including its simple form, the worker must 1) act as a buyer of means of consumption, (2) consume them and (3) reproduce former labor power. In view of the above, the *complete* image of circulation of commodity form of simple labor power value is the following:

$$C_{LP} – M_{PW}... C_{W}... W – M_{WP}... M_{PDI} – \\ – C_{MC} ... P_{C} ...S_{F} – C_{LP}, \quad (7)$$

where M_{PDI} – personal disposable income; C_{MC} – means of consumption as a commodity; P_{C} – process of consumption; S_{F} – satisfaction/dissatisfaction with the process of consumption; C_{LP} – reproduced labor power in the same quality and volume, i.e., speaking Marxist language, a simple reproduction of a commodity "labor"[8].

[8] In this article we cover simple labor power that corresponds to and must comply with minimum wage. It does not analyze expanded reproduction of labor power and workers' skill improvement.

Based on the issue of minimum wage and living wage, the reproduction of the commodity form of labor power value can be represented as follows:

$$C_{SLF} - M_{PW}... C_{UL}... W - M_{MW}...M_{MPDI} - C_{CB} ... L_{LW}...S_{MS} - C_{SLF}, \quad (8)$$

where C_{SLF} – simple, as a rule, unskilled labor power; M_{PW} – prepaid minimum wage, which is approximately 40% of minimum wage; C_{UL} – unskilled labour; W –work performed, as a rule, in the form of services; M_{MW} – minimum wage; M_{MPDI} – minimal personal disposable income; C_{CB} – consumer basket; L_{LW} – living wage; S_{MS}–minimum satisfaction/dissatisfaction with living wage; C_{SLF}– reproduction of simple labor power.

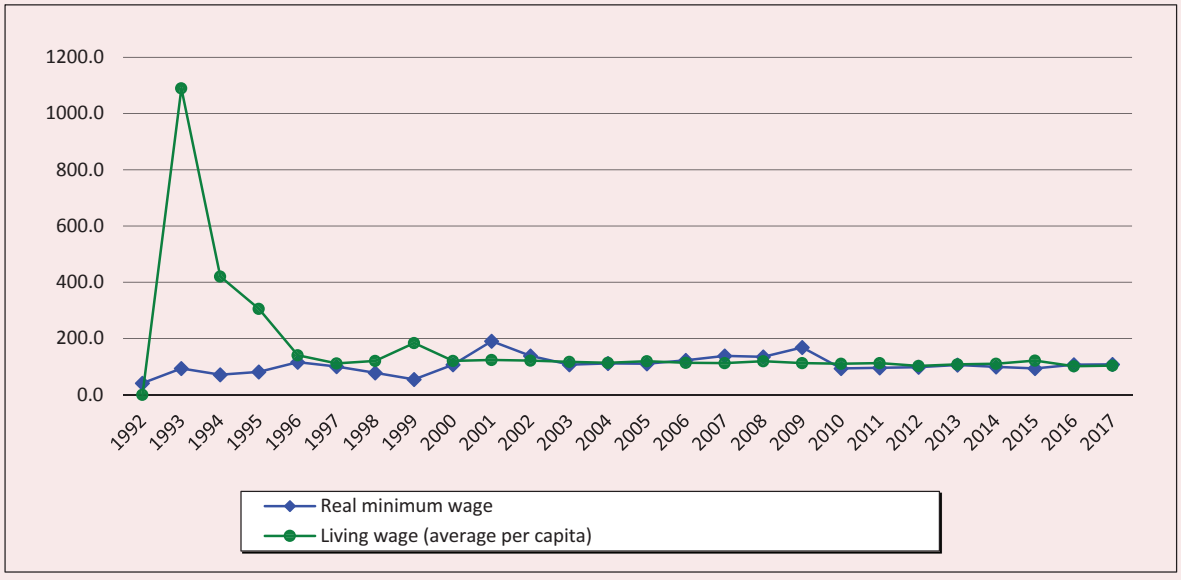
Formula 8 *theoretically* links minimum wage, consumer basket and living wage. This provision is an important methodological and conceptual basis for the normative-positive analysis of the current trends in minimum wage and living wage in the Russian economy as a whole, as well as separately for the selected group of agricultural regions.

Analysis and explanation of empirical results

The study of Russian trends in minimum wage helped identify the main problems in the economy in terms of wage.

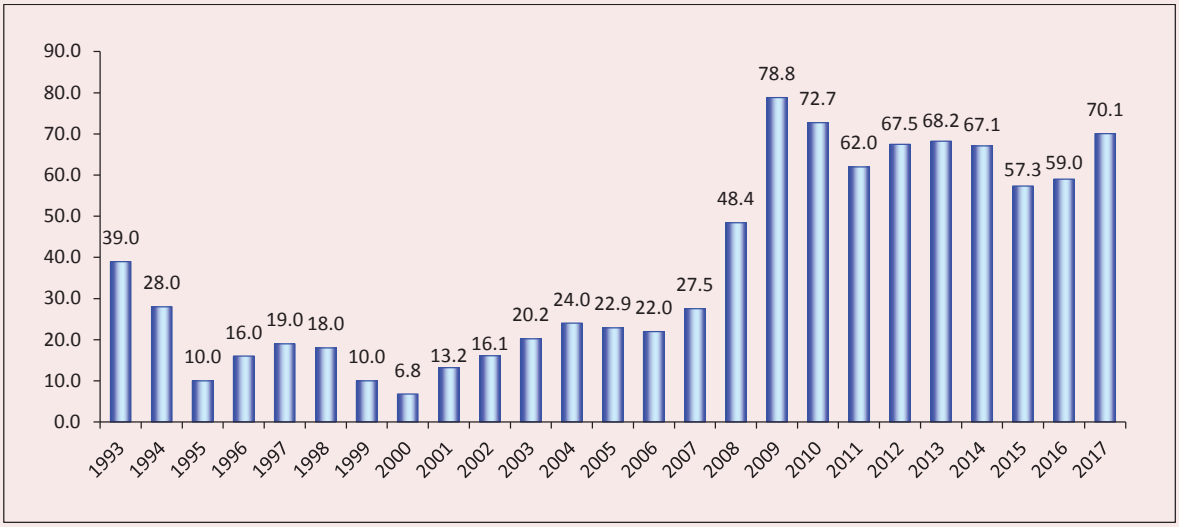
1. Empirical analysis shows that during the 25-year period in the Russian economic activity there was a gap between minimum wage and living wage. During this period, the Russian

Figure 1. Minimum wage and living wage, % to previous year



Sources: *Russia in numbers. 2018: brief statistics book*. Rosstat. Moscow, 2018. Pp. 117, 120; *Russia in numbers. 2017: brief statistics book*. Rosstat. Moscow, 2017. Pp. 118–120, 130; *Russia in numbers. 2016: brief statistics book*. Rosstat. Moscow, 2016. Pp. 118–120, 130; Russia in numbers. 2015: *brief statistics book*. Rosstat. Moscow, 2015. Pp. 118, 120, 130; *Russia in numbers. 2014*: *brief statistics book* Rosstat. Moscow, 2014. Pp. 128, 130; *Russia in numbers. 2013: brief statistics book* . Rosstat. Moscow, 2013. Pp. 128, 130; *Russia in numbers. 2011: brief statistics book*. Rosstat. Moscow, 2011. Pp. 116–117; *Russia in numbers. 2008: brief statistics book*. Rosstat. Moscow, 2008. Pp. 116–117; *Russia in numbers. 2004: brief statistics book*. Federal State Statistics Service. Moscow, 2004. Pp. 99–100; *Russia in numbers*. 2000: *brief statistics book*. Goskomstat of Russia. Moscow, 2000. P. 99.

Figure 2. Ratio of minimum wage and living wage in Russia in 1993–2017, %



Sources: *The Social Status and Standard of Living of the Russian Population*. 2017: statistics book. Rosstat. Moscow, 2017. P. 141; *The Social Status and Standard of Living of the Russian Population. 2011: statistics book*. Rosstat. Moscow, 2011. P. 176; *The Social Status and Standard of Living of the Russian Population. 2008: statistics book*. Rosstat. Moscow, 2008. P. 182; *The Social Status and Standard of Living of the Russian Population. 2006*: *statistics book*. Rosstat. Moscow, 2006. P. 187; *Russian Statistics Yearbook. 2003*: *statistics book*. Goskomstat of Russia. Moscow, 2003. P. 195; *The Social Status and Standard of Living of the Russian Population. 2001*: *statistics book*. Goskomstat of Russia. Moscow, 2001. P. 24; *Russian Statistics Yearbook. 2001*: *statistics book*. Goskomstat of Russia. Moscow, 2001. P. 171.

economy lost the reproductive function of minimum wage. Since 1992, a significant difference has formed between the nominal value of minimum wage and living wage, which has increased over years. In the following years (1993–1998), the government's policy on regulating wages of low-skilled workers was focused on increasing the nominal value of minimum wage, yet with an annual decline in its growth rate. Due to the crisis of 1998, the amount of minimum wage remained unchanged in 1997–1999 (*Fig. 1*).

The performance of living wage in the Russian economy in the first decade of economic transformations lied in the fact that growth rates of living wage were greater than the rate of annual minimum wage increase. This was particularly evident in 1993–1995 and 1998–1999. It was during these years that the differences were so significant that the economic policy measures taken in the next 15 years did not significantly increase the nominal value of minimum wage or overcome its lagging behind living wage. The superiority of annual growth rates of minimum wage over the growth rates of living wage in 2001–2002 and 2006–2009 also did not eliminate the lag accumulated over previous periods.

The period of recovery growth in the Russian economy[9] in 2000–2007 had a positive impact on the performance of minimum wage

[9] During the period of recovery growth reviewed during 1999–2008, there was a "restoration of the socio-economic level achieved under socialism", where growth was mainly associated with "an increase in export prices for oil and an increase in prices for a number of other commodities" [37, p. 10].

and living wage. During this period, there was a reduction in the difference between these indicators, which has remained up to the present time (*Fig. 2*).

The law on increasing minimum wage adopted in 2018 is aimed at eliminating the nominal gap between these indicators. However, this measure does not mean that minimum wage that equals potential living wage provides the necessary minimum funds for *proper* reproduction of labor power of an employee and their family members. Moreover, low living wage established in certain regions does not take into account the full cost of basic means of subsistence (clothing, food, utilities, rent/purchase of housing, raising children, medical services, etc.), which contradicts the legally established and theoretically justified logical connection between living wage, consumer basket and minimum wage. For example, in Altai Krai at the end of 2018, minimum wage for the public sector of economy at the level of established federal value does not ensure the reproduction of labor power of worker with such wages. According to statistics for November 2018, renting a one-room apartment in the region amounted to 9,000 rubles a month (respectively, purchase of housing will require even more expenditures in the form of down payments, and in case of borrowing bank resources – also repayment of a mortgage loan). At such expenses on satisfaction of other needs – in food, clothes, education of children, etc. – a little more than 2,000 rubles is left, which makes it completely impossible to ensure simple reproduction of labor power.

2. Despite the legislative requirement that minimum wage should not be lower than living wage, in practice there is still a phenomenon when a part of the working-age employed population receives minimum wage below the established minimum wage. This negative trend indicates that even the *minimum* level of reproduction of labor power is limited.

It is known that minimum wage established at the federal level and applied in regions for regulating labor relations is the standard basis for worker's social guarantees. In this sense, minimum wage is associated with many *institutional aspects*, with the established legal standards and rules having a special place. In particular, the institution of contractual regulation of labor relations between the employee and the employer forms a mechanism regulating standard working hours, the form of accounting working hours and produced products (respectively, time or price wage system), etc. The legislatively established lower wage limit in the form of minimum wage should be aimed at providing the employee with a guarantee to create *proper* financial conditions for the reproduction of labor power. However, the fact that in the Russian economy there is still a number of employees receiving wages below the minimum established level (according to 2017) indicates the absence of a mechanism for protecting employees in the labor market.

Comparative analysis of data of federal statistics of organizations on the distribution of employees by wage in 2017 revealed an increase in the number of employees receiving wages below minimum wage by 0.4 p.p compared to the same period in 2015. At the same time, there was a reduction in the number of employees whose wages were below living wage and from 1 to 2 living wages in the analyzed periods (*Tab. 1*).

Table 1. Distribution of employees by wage in the Russian economy for April 2015 and 2017, %

Accrued wages	Number of employees	
	2015	2017
Lower than minimum wage*	1.4	1.8
Lower than living wage**	10.7	7.3
1 to 2 LW	28.5	26.7
2 to 3 LW	24.7	24.6
3 to 4 LW	14.9	16.3
4 to 5 LW	8.3	9.5
More than 5 LW	13.0	15.6

* As of January 1st, 2015, minimum wage in the Russian economy was 5,965 RUB, January 1st, 2017 – 7,500 RUB.
** Living wage (LW) of the working population in the 1st quarter of 2015 amounted to 10,404 RUB, in the 1st quarter of 2017 – 10,701 RUB.
Sources: *Labor and employment in Russia: statistics book*. Rosstat. Moscow, 2017. P. 240; *Labor and employment in Russia, 2015: statistics book*. Rosstat. Moscow, 2015. P. 255; *The distribution of the number of employees by wage for April 2015: statistics bulletin*. Rosstat. Moscow, 2015. Pp. 77–82; *The distribution of the number of employees by wage for April 2015*: *statistics bulletin*. Rosstat. Moscow, 2017. Pp. 77–82 .

Figure 3. Minimum wage and consumer price index in Russia in 1992–2017, % to previous year

Sources: calculated by: *Russia in numbers. 2018: brief statistics book*. Rosstat. Moscow, 2018. Pp. 36, 120; *Russia in numbers. 2017: brief statistics book*. Rosstat. Moscow, 2017. Pp. 36, 120; *Russia in numbers. 2016: brief statistics book*. Rosstat. Moscow, 2016. Pp. 36, 120; *Russia in numbers. 2015: brief statistics book*. Rosstat. Moscow, 2015. Pp. 36, 120; *Russia in numbers. 2012*: *brief statistics book* Rosstat. Moscow, 2012. P. 36; *Russia in numbers. 2011: brief statistics book*. Rosstat. Moscow, 2011. Pp. 116–177; *Russia in numbers. 2009: brief statistics book*. Rosstat. Moscow, 2009. P. 33; *Russia in numbers. 2008: brief statistics book*. Rosstat. Moscow, 2008. Pp. 116–117; *Russia in numbers. 2006: brief statistics book*. Federal State Statistics Service. Moscow, 2006. P. 33; *Russia in numbers. 2004: brief statistics book*. Federal State Statistics Service. Moscow, 2004. Pp. 30, 99–100; *Russia in numbers*. 2000: *brief statistics book*. Goskomstat of Russia. Moscow, 2000. Pp. 30, 99.

At the same time, there is a trend in the Russian economy towards increasing the number of workers whose wages were distributed in the range above 2 LW. These results show an increase in the differentiation in labor income.

3. An important issue for analysis in the study of the correlation between living wage and minimum wage is the study of monetary losses of the purchasing power of minimum personal disposable income (DPDI) associated with an increase in prices of consumer goods.

The indexation of minimum wage is one of the measures of the state's wage policy. Depending on the performance of nominal minimum wage and the growth rate of consumer prices, we can talk about the possible preservation of the purchasing power of established minimum wage for workers receiving it as their main income. During the analyzed period, the growth rate of minimum wage in some years was several times lower than that of consumer prices. As a result, the purchasing power of low-paid employees has been lost. *Figure 3* clearly shows the lag in the growth rate of nominal minimum wage behind the growth rate of consumer prices over the past 26 years. The greatest difference in these indicators (more than 1.5 times) in 1992 was not compensated for low-paid Russian employees over the following years. Due to the measures taken by the government in certain periods (1996, 2000–2009, 2013, 2016–2017), the annual growth rates of consumer prices were less than the growth rates of minimum wage, according to official statistics. However, these positive trends did not compensate for the lost purchasing power of minimum wage for the rest of the years, as a result of which they did not contribute to improving the standard of living of recipients of minimum wage and creating conditions for the reproduction of their labor force.

4. The problem of reproduction of labor power is especially significant in relation to specific regions with minimum wage lagging behind minimum wage set at the federal level on the one hand, and differentiated wage due to differences in the standard of living (for example, the difference in living standards in Southern and Northern regions) on the other hand. The latter circumstance suggests that if in such regions different standard of living is formed with the establishment of appropriate living wage, then the existing differentiation in wages is a justified phenomenon for a developed economy. Thus, the value of low-skilled simple labor (minimum wage) in the Far North is higher based on a higher standard of living in this territory, as well as due to the established increased regional premium rate.

However, in contrast to the theoretical provisions and legislative standards, in the Russian practice minimum wage also differs for employees in regions with the same profile[10]. This was confirmed by the analysis of individual regions with agriculture as one of the leading sectors. The data suggest that, despite the average wages in agriculture in Russia, in some regions there still are employees with wages below minimum wage. We are talking about regions such as the Belgorod, Voronezh, Kursk oblasts, the Republic of Crimea, where this figure is 0.3, 2.0, 1.3 and 2.4%, respectively. To compare,

[10] According to the estimates, the difference in wages received by employees of the same professions, but different regions reaches two times [37, p. 12].

Table 2. Share of agriculture in GVA, average annual number of employees in agriculture and number of employees with wages below minimum wage in some regions with agricultural profile, %

Regions	Share of agriculture in total GVA in Russia in 2015, % to total	Average annual number of employees in agriculture in 2016, % of total employees	Employees with wages below minimum wage in the Russian economy (as of April 2017 – 7,500 rubles per month)
Belgorod Oblast	20.8	13.9	0.3
Voronezh Oblast	15.3	13.5	2.0
Kursk Oblast	18.9	12.2	1.3
Republic of Crimea	17.0	14.2	2.4
Stavropol Krai	17.2	17.2	4.7
Altai Krai	17.3	13.9	6.0

Sources: compiled by the authors using statistics from: *Regions of Russia. Socio-economic indicators. 2017.* Pp. 178–179, 554–555; *Distribution of employed by gross wages since 2017.* EMISS. Available at: https://fedstat.ru (Accessed: 10.03.2018).

Stavropol and Altai krais, where the number of employees with wages below minimum wage set at the federal level was 4.7 and 6.0%, are similar in terms of the share of agriculture in GVA and the average annual number of employees in agriculture (*Tab. 2*).

Of course, a particular profile in the region has an impact on wage formation in its territory. However, in Russia there is a trend to differentiate wages between regions of one type of profile. The only explanation for maintaining a relatively high level of minimum wage in such regions is the well-developed regional policy and strategy of enterprises together aimed at creating conditions for the reproduction of the labor power and the formation high standard of living[11].

Conclusion

The legislative leveling of minimum wage and living wage in 2018 contributed to the emergence of various scientific publications which reflect the following general and controversial aspects.

First, on the one hand, the leveling of minimum wage and living wage is generally recognized as an important measure in maintaining the standard of living of low-paid workers [38]. On the other hand, there is an opposite view in scientific research, according to which this leveling will not improve the situation among low-paid employees – recipients of minimum wage [1].

Second, the issue of estimating minimum wage and the corresponding living wage in market economy is debatable. We note that minimum wage and living wage must include the full range of *basic* consumer goods, i.e. 1) *mandatory* payments (taxes, utilities, etc.), 2) consumer costs associated with basic consumer choice, and 3) minimum savings.

Third, the most controversial is the issue of including in minimum wage housing payments and mortgage payments since this method is the main means of acquiring housing in modern conditions.

Fourth, the continuing differentiation in minimum wage in regions of agricultural (agro-industrial) profile requires the revision of the

[11] These results will be presented in a separate article in more detail.

state wage policy in order to support low-paid workers in leading industries, for example, in the form of increasing regional premium rates, etc.

The main conclusion is the following: it is necessary to carry out *system* reforms in wages, aimed at reconsidering the existing regulatory levels of minimum wage and living wage. In particular, it is necessary to develop mechanisms for determining the remuneration level taking into account regional specific features and industry characteristics.

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Determinants of Job Satisfaction of Workers from Generations X and Y: Regional Research

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Abstract. The paper discusses job satisfaction in the context of different generations of workers and the entry of new representatives in the labor market. The study is both theoretical and applied; it uses materials of quantitative and qualitative research on the issues under consideration. The main source of empirical data is a sociological surveys conducted in 2015 and 2017 according to the method of random non-repetitive sampling among employees of individual enterprises of different forms of ownership operating in Podlaskie North-Eastern region of Poland, and analysis of the data. The goals of our work are to identify the most important organizational factors that influence job satisfaction and to identify differences between the employees from the older generation (X) and the younger generation (Y) at regional enterprises of different ownership forms as objects of functional management. According to four indicators reflecting professional job satisfaction (working conditions, sense of self-worth, possibility of development, relations with other employees), the findings of our study revealed similarities and differences between them in the older and younger generations. Similarity consists in the fact that material results of activity are a priority for both generations of workers. Difference consists in the predominance of pragmatism in the younger generation and conservatism in the older generation. The study is of theoretical and practical importance in the field of professional business management in the region. It indicates what factors are important for the younger generation of workers in the context of achieving job satisfaction compared to the older generation. Therefore, the management of any enterprise should use a variety of management tools to improve the efficiency of its activities, for example, to differentiate the motives that will satisfy different needs and incentives in the work of employees of different age groups.

Key words: professional job satisfaction, job satisfaction of generations X and Y, labor efficiency.

Introduction

Job and labor satisfaction is one of the widely studied logical structures in social sciences. There are many studies on job satisfaction and its impact on employee engagement [1, 33. 991–1007; 2], on staff turnover and absenteeism [3, pp. 1146–1151], labor efficiency [4, pp. 165–175] and even the health and well-being of an employee [5, pp. 65–91].

Numerous studies also indicate a positive correlation between employee and customer satisfaction [6, pp.161–171], which is confirmed by the fact that the employees' approach (including satisfaction) affects not only the results of their work, but also the entire organization [7, pp. 57–61]. This issue is of interest among researchers in various fields and disciplines (sociology, psychology, economics and management). However, there are several other aspects of the problem that require attention. One of them is the coexistence of different generations of workers (X, Y) and the entry into the labor market of their new representatives (generation Z).

The development of these generations of workers is associated with historical, political, and socio-economic changes and technology development. Significant changes in this area, which accumulate experience of these generations, determine the belonging to a particular age group with individual characteristics. It is believed that the current generation sees their work not only as a source of income, but also as a place where the employee can realize their own goals and aspirations, become independent and confirm their own value.

The perception of a workplace in the context of the working environment and the feeling of

professional satisfaction is determined by both personal characteristics and organizational indicators [8, pp. 5–12; 9, pp. 617–637]. Based on this approach, the category of job satisfaction can be considered both from the internal (personal traits, relations, values, knowledge, skills) and the external (organizational factors) point of view. External satisfaction is related to a specific situation and professional environment: organizational climate, management style, working conditions, relations with colleagues, etc. The determinants of internal satisfaction influence the perception of importance of external satisfaction indicators. What an employee perceives as satisfactory results directly follows from their internal needs.

Due to the differences in characteristics of different generations in terms of their attitudes and values, it can be expected that the perception of organizational factors, working conditions which affect job satisfaction are different. It is therefore important to identify factors that may affect job satisfaction. Thus, research in this area is of great practical importance. The diverse perception of external indicators of satisfaction among employees of different generations has an impact on the application of specific methods of personnel management. The management techniques used for older generation (X) may be quite useless in case of younger generation (Y).

In view of the above, we set the objective of the research to determine the organizational factors that affect job satisfaction and try to answer the following questions: are there differences in the perception of certain organizational factors that affect job satisfaction of generations X and Y, and what factors are the most important for generation Y.

Literature review

The construct of job satisfaction. The classic definition of job satisfaction is as a set of feelings and employee's attitude to work [10, pp. 891–906], that is, a positive attitude of employees to their duties, as well as to colleagues and the working environment, accompanied by a sense of satisfaction [11]. The term "satisfaction" is often interchangeable with the term "fulfilment". A significant part of researchers consider these concepts synonyms, although some authors point out the differences between them. It is believed that satisfaction is a strong sense of fulfilment [12, p. 228] which is usually left after a long period of satisfaction, as opposed to temporary satisfaction, which is instantaneous [13, pp. 192–196]. G.G. Tatarova and G.P. Bessokirnaya have similar definitions of these concepts: "Job/labor satisfaction is, in fact, an interdisciplinary category characterizing the state of labor relations from the position of the subject of labor. ... However, empirical studies usually record job satisfaction, that is, labor satisfaction here and now. These two terms are often used as synonyms" [14, pp. 8–26].

In addition to the terms "satisfaction" and "job satisfaction" there is also the concept of "job satisfaction". The use of these terms interchangeably here is a result of compatibility of definitions and clarity [15] and is quite common in literature because of the way the purpose of source identification is se and the level of perceived satisfaction associated with work is measured [16, pp. 54–56].

In this study, job satisfaction is defined as a pleasant and positive attitude towards one's work as a result of perception of work, working conditions and workplace, job responsibilities and professional environment.

Job satisfaction is one of the key categories in a company, as it means that employees work more and better if they are satisfied [17, pp. 4–9] as perception of work in terms of meeting individual needs in the workplace [18, pp. 34-

40] and performing certain tasks in specific physical and social conditions [19, p. 115]. Job satisfaction is also determined by favor and disfavor of one's work [20, p. 210]. It is noteworthy that satisfaction is a feeling that can gradually decrease or increase: an employee can be very satisfied with their work, moderately satisfied or almost satisfied. Moreover, an employee may feel satisfied with certain stages of work such as objectives performed, while other components such as wage will leave them dissatisfied. These partial feelings related to individual components of labor form ultimate job satisfaction.

In literature, there are many theories and studies that determine the organizational (external) indicators, the most frequently mentioned factors that affect job satisfaction (*Tab. 1*).

At the same time, many authors agree that satisfaction is influenced by: (a) general working conditions related to the characteristics of work, wage or stability of employment; (b) the content of work performed, i.e. tasks performed, independence, an opportunity of development and promotion; (c) work environment: relations with superiors and other employees, organizational culture and management methods.

The context of generations. Generation is a certain group of people, which can be distinguished by indicators such as: birth year and age, experience associated with education in similar social, economic and political conditions [24, pp. 749–751; 25, p. 72].

Nowadays managers at many enterprises are facing the problem associated with the presence of several generations at these enterprises; they are characterized by different expectations and attitudes to work. Therefore, it is important to study the factors that determine job satisfaction, provide managers with knowledge in creating appropriate working conditions that contribute to increasing the satisfaction of workers from different generation groups.

The most widely used classification is that which distinguishes the generation born before war, i.e. in 1920–1945; the *baby-boomers* generation or the so-called demographic peak generation that took place after war, in 1946–1964; and generation X, i.e. those born in 1965–1979. The latter includes workers aged 39–53 years and over; generation Y, called *the internet generation*, *generation net*, *millennials, generation next* or *nexters* [26; 27] born between 1980–2000: the workers aged 18–38. Generation Z, i.e. those born after 2000 are workers aged 15–18. The classification

Table 1. Organizational factors in job satisfaction

Author of research	Factors in job satisfaction
Essen, 2002	Stability of employment, additional benefits in addition to wages, communication between employees and managers, as well as other professional groups, an opportunity to balance career and personal life, remuneration, an opportunity to be promoted, develop, the content of work performed, recognition of high quality work by the authorities, good relations with the immediate supervisor, autonomy and independence to make decisions, corporate culture, workplace safety, training, the importance of work and good relations with colleagues.
Schulz, Schulz, 2002	Remuneration, promotion, control, working conditions, relations, achievements, independence, recognition.
Schulte et al., 2006	Organizational culture, awareness that people are valued and respected.
Mendoza, Maldonado, 2014	Management techniques, working conditions, job description.
Source: compiled by the authors using [17; 21; 22; 23].	

is typical for the American society and may differ slightly in the range of years in different countries due to cultural, social and economic differences [28]. The most representative groups of employees of modern enterprises of different forms of ownership in Poland and its regions are generation X and Y [29, pp. 118–134]. Thus, further analysis will be based on these two generation groups.

Generation X is a generation of professionally active people for whom work is of great importance. The most important values for them are: personal development, independence, diversity, initiative, hard work [30, p. 44]. Professional career is associated with hard work, conscientious performance of their duties, often at the expense of imbalance between work and personal life [31, pp. 11–12]. The satisfaction of this generation depends on success at work, high position and work image. This generation s characterized by [32; 33]: loyalty, workaholism and high work ethics, recognition of authorities, a sense of importance and suitability at work, good relations with the team, which is expected to support, the pleasure of work, which reinforces motivation.

In contrast, generation Y is a relatively homogeneous group with different values, patterns of behavior and expectations than the previous generation. It is pointed out that the representatives of this generation are more trusting, tolerant, and mobile (Furlow, 2011), appreciate independence and self-sufficiency (34; 10], moreover, they are better educated, especially in terms of technological progress [35, pp. 70–76], they attach greater importance to the quality of life [36, pp. 61–84]. They are brought up in free access to information using latest technologies and therefore are well-versed in the surrounding, often virtual, reality, which, in turn, is a weak point of the older generation. On the one hand, they can communicate well by e-mail, SMS, all kinds of messengers, but it is more difficult for them to have a "face to face" conversation. This can weaken the relations with others, especially colleagues, which in the context of work can have a significant impact on their sense of job satisfaction. In this regard, the following research question was formulated:

RQ1: *Are relations with colleagues more important for generation X than for generation Y as an organizational factor affecting job satisfaction?*

As generation Y have different values than the previous generation, they also have different expectations about the workplace, the tasks to be performed, and the role of a manager. *Millennials* expect that their work will help them fully use their knowledge and skills, which has a positive impact on their motivation [36]. They want to do hard work that stimulates creativity and enables them to become a member of a dedicated and motivated team; they want to be led by open, positive managers [26] who will provide them with regular feedback on the work they do [27]. The opportunity of career development, acquisition of new knowledge, additional training, professional development is also important for them [37, pp. 42–63]. The opportunity of continuous training and using creative solutions win in confrontation with routine work. However, opinions differ regarding to the role of remuneration. Some researchers point out that remuneration is less important for generation Y than for generation X, while others believe that remuneration is an important or even the most important aspect of their work [34;. 38, pp. 43–58]. Moreover, remuneration should be directly related to performance and value added created by an employee. Other research questions were put further:

RQ2: *Is wage more important for generation Y than for generation X as an organizational factor affecting job satisfaction?*

RQ3: *Is awareness of value created for the enterprise more important for generation Y than for generation X as an organizational factor affecting job satisfaction?*

There is no doubt that if the expectations of generation Y in terms of work are not met, this may be reflected in dissatisfaction [39, pp. 256–268]. They do not feel attached either to the profession or to the employer and have no problems with changing jobs [36]. Consequently, the methods of managing employees used by managers so far may not be effective applied to this generation characterized by a new approach to work and their role in it, as well as bold demands on working conditions.

The most significant aspects for this generation are: flexibility, mobility (from the point of view of changing profession, company, place of residence), self-fulfillment (development of non-professional skills, hobbies, interests and their implementation). Therefore, it is very important to define the concept of professional satisfaction in the case of this generation, for which another research question was put:

RQ4: *What organizational factors affecting job satisfaction are the most important for generation Y compared to generation X?*

Research methodology and methods

The study was conducted in two stages: in June 2015 and in November 2017 – at the enterprises of various forms of ownership in Podlaskie North-Eastern region of Poland. At the first stage, based on the method of quantitative research we used PAPI (Paper and Pencil Interview) method for data collection through random selection of respondents. First, a random sample was used among working students of Politechnika Bia ostocka (Bia ystok Technical University) as representatives of generation Y to ensure the internal accuracy of the research and representative sampling. Then the "snowball" technique was used, which helped cover respondents of appropriate age, that is, those who meet the criteria of generation X. In general, the survey was addressed to 256 respondents, who gae back 102 filled questionnaires with answers to the questions. The second stage of the research included structured in-depth interviews with the representatives of both generations to clarify the information obtained during the quantitative study. Surveys were conducted among 20 representatives of generation X and 20 representatives of generation Y. The respondents were selected by random non-repeated sampling. The respondents were people who were different from those who participated in quantitative research. The use of a mixed approach in the research, using both quantitative and qualitative methods of data collection, helps better understand the problem under review and provides a higher confidence level in the results obtained than the use of a single method.

The surveyed enterprises of Podlaskie region by the number of surveyed employees were distributed as follows: 58% – small (less than 50 employees); 17% – medium (less than 250 employees); the rest – 25% – large enterprises (250 or more employees). Half of the surveyed enterprises (51%) were engaged in provision of services, a third (35%) – in production, the rest (14%) had a mixed profile.

The distribution of enterprises by profile and number of employees helped obtain a fairly complete image of perception of importance of certain factors in job satisfaction among

Table 2. Characteristics of respondents (N= 142, % of respondents)

Characteristics of respondents	Share in total number, %
Sex	
Female	41
Male	59
Education	
Higher	37
Secondary	58
Vocational	5
Belonging to generation	
Representatives of Generation X	35
Representatives of Generation Y	65
Professional experience	
1–5 years	53
6–10 years	18
11–20 years	17
More than 20 years	12
Legal basis of employment	
Employment agreement	41
Fixed-term employment agreement	19
Contractual order	24
Other	16
Source: authors' own solution.	

workers of different generations. The respondents were employees of various professional groups of surveyed companies selected through random non-repeated sampling. *Table 2* shows the characteristics of respondents.

The majority of respondents of generation Y have little professional experience (53%) – from 1 to 5 years and at least secondary education (58%). A significant share of people work under an employment agreement (60%), including open-term and fixed-term.

The purpose of the research was to identify significant organizational factors affecting job satisfaction for the representatives of generation X and Y.

Based on analysis of the scientific literature, 20 factors affecting job satisfaction were identified, relating to management techniques (e.g. management style, work environment, correct assessment); working conditions (stability of employment, flexibility, fair remuneration system); management tools applied (promotion and training opportunities) and relations with managers and colleagues. The respondents were to assess the importance of these factors in terms of satisfaction on a five-point scale, where 5 – very high satisfaction, 1 – very low).

Research results

The outlining of the research results began with the analysis of individual groups of factors in order to group similar values in larger groups. This reduced the number of variables and identified the most important aspects characterized by various factors affecting employee satisfaction with work (*Tab. 3*).

As a result of data analysis through *Statistica* program four main components (Varimax rotation of standardized factors) were identified. The following elements were not taken into account: full use of potential, self-esteem,

Table 3. Factor analysis of elements affecting job satisfaction

Characteristics of factors	Indicator 1	Indicator 2	Indicator 3	Indicator 4
Full use of potential	-0.247508	0.145387	0.131996	0.440489
Self-esteem	0.378837	0.154842	0.081328	0.302821
Recognition by a manager	0.384774	0.277392	- 0.059034	0.402783
Awareness of value for the company	0.034129	**0.730979**	0.125220	0.138237
Measurement of part of value invested in company's growth	0.114933	**0.747875**.	0.024525	0.387796
The feeling that someone is part of the team	0.146862	0.425455	- 0.045066	**0.654405**
Independence in carrying out one's work	0.096388	**0.649211**	0.231447	- 0.024503
Engagement in work	0.265966	0.272362	0.412217	0.254947
Promotion opportunities	0.332801	0.295971	**0.517155**	- 0.281483
Opportunity to acquire new knowledge and skills	0.194617	0.042110	**0.806003**	0.075719
Participation in training	0.165398	0.292395	**0.651177**	- 0.022145
Ability to perform various tasks	0.080165	0.031022	**0.719700**	0.318756
Interesting work	0.423089	- 0.103650	0.342277	0.435410
A pleasant (comfortable) place to work	0.323841	- 0.231436	0.239344	**0.605461**
Friendly relations with colleagues	0.264566	0.199139	0.073193	**0.584574**
Remuneration corresponding to professional competences	**0.771429**	0.013500	0.147288	0.062415
Remuneration corresponding to work results	**0.716429**	0.113000	0.046362	0.128975
Flexible working hours	0.039170	0.366179	0.311289	0.092560
Stability of employment	**0.559026**	- 0.211079	0.178271	0.175340
Ability to balance work and personal life	**0.641426**	0.319767	0.086790	- 0.036683
Percentage accumulation of variance of random variable	**25.24**	**34.94**	**43.36**	**50.15**
Cronbach's alpha	**0.833**			

* Specified units > 0.55.
Source: authors' own solution using Statistica program.

recognition by a manager, engagement in work, interesting work, flexible working hours. We distinguished four factors explaining in total 50.15% of variance of a random variable in particular, the first figure is 25.24% of variance of a random variable. Cronbach's alpha is 0.833, which means that the responses received are relatively reliable.

Based on the analysis, a group of certain indicators affecting job satisfaction of employees is identified.

Indicator 1 – working conditions – is defined as remuneration received according to the existing professional competencies: remuneration received according to work results; stability of employment; ability to balance work and personal life.

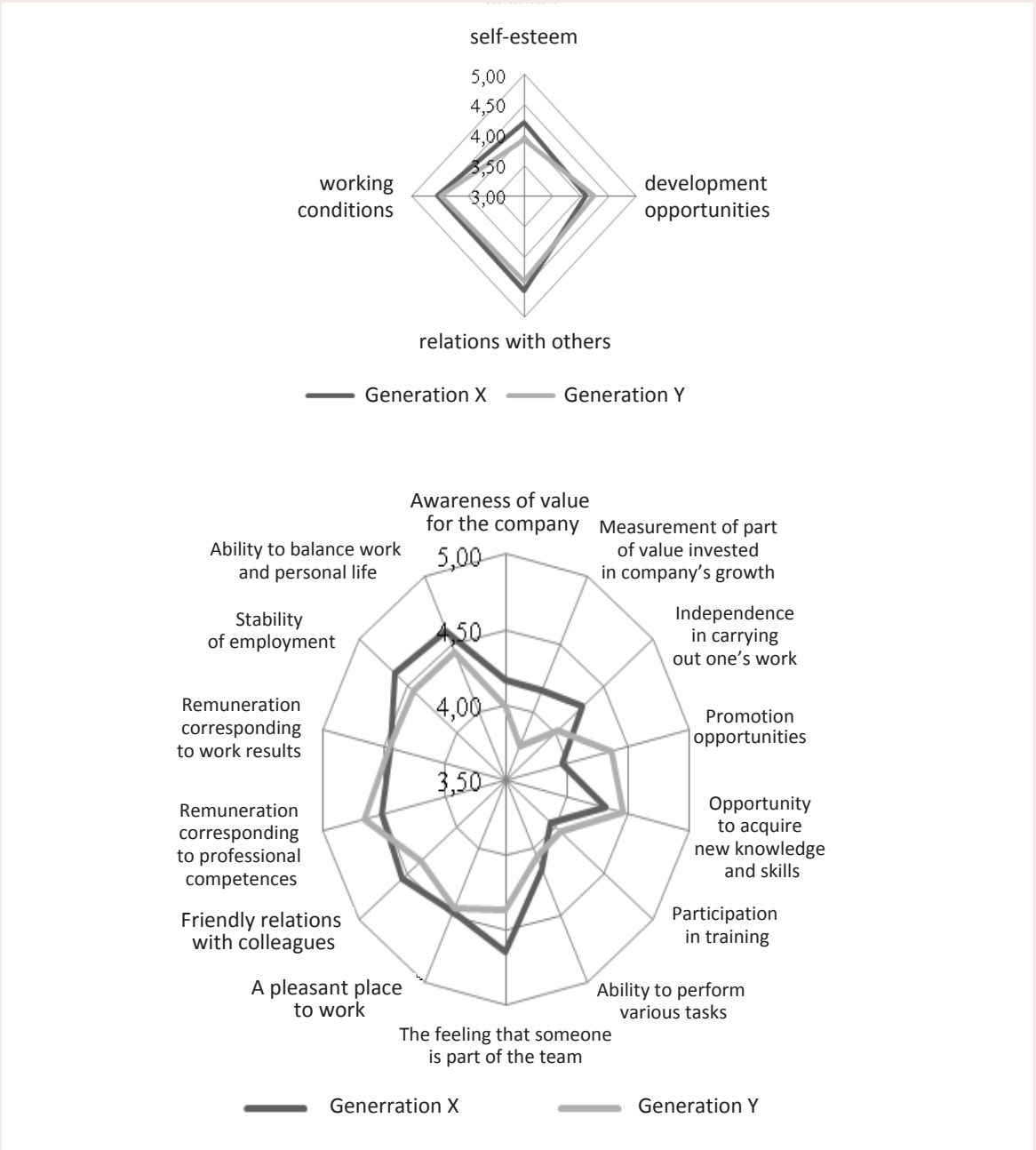
Indicator 2 – feeling of self-worth – is defined as the awareness of value for the company, the need to measure the contribution to the company's value, as well as independence in work.

Indicator 3 – development opportunity – is associated with career development, acquiring new knowledge and skills, performing various tasks, participation in training.

Indicator 4 – relations with other employees – is defined as the feeling of being part of a team, friendly relations with colleagues, pleasant, comfortable place of work.

Next, we conducted comparative analysis of a specific construct for workers of generations X and Y (*Figure*). The analysis proves that there are small differences between individual

Importance of job satisfaction indicators for generations X and Y



Source: authors' own solution.

indicators affecting job satisfaction and helps draw some conclusions. The most similar are responses related to working conditions (on average 4.55 for generation X and up to 4.5 for generation Y), and at the same time this indicator significantly affects the feeling of satisfaction. Remuneration mentioned in this group of indicators is more important for generation Y. This is also supported by the views expressed in the interviews. The respondents of generation X noted that "remuneration is of secondary importance, the paramount is the idea of what you do, what you like and pleases you at work" and "if you work in unpleasant conditions, no money will give you satisfaction at work".

On the other hand, Y respondents often expressed opinions such as "remuneration is one of the key factors affecting job satisfaction" or "remuneration is very important and we work to achieve financial benefits, I believe that financial motives are the most important".

Generation X appreciate relations with others, although their average rank is almost the same as in the case of working conditions, namely 4.56. This group of job satisfaction factors is less important for generation Y, but it is the second important. According to the interviews, the representatives of specific generations point to completely different difficulties associated with building and maintaining good work relations. Generation X note more often that this was the result of "competition, unwillingness to share knowledge" and "envy and jealousy", while generation Y were much more likely to emphasize "the differences in opinions" or "the differences in character, status, shared beliefs or habits". This may indicate the younger generation's greater awareness of the differences between people and probably greater recognition.

The greatest controversy is observed in terms of awareness of the value for the company and the need to measure it – an average of 4.2 for generation X and 3.9 for generation Y, respectively. This is the only group of factors that was estimated below average (4) for generation Y.

The following answers were given to the question of how awareness of the value created for the company affects job satisfaction: "If we know that what we do affects company's development and the management express gratitude, then we work better, with greater satisfaction and productivity (generation X); "If we are valued, we are satisfied with work" (X) and "It helps us judge whether the work we do has a purpose and is useful for something/someone" (Y); "We realize that what we do affects the functioning of the company and is therefore very important" (Y); "It identifies us with the company" (Y). These statements may indicate that the value created for the company for the older generation of respondents should be assessed by the supervisor, while for younger respondents it is more identified with the sense of doing something important.

All these groups of job satisfaction factors (working conditions, relations with others, and self-esteem) were rated higher by generation X. The only group of factors that was rated higher by generation Y than by generation X is the opportunity to develop. This is confirmed by the results of previous studies, which show that life-long training, acquiring new knowledge, the opportunity to develop skills, as well as rapid career are elements of professional environment important for the younger generation. Therefore, together with the corresponding remuneration, these are important factors in job satisfaction.

Conclusions

When forming final research results, it should be noted that relations with other people are less important for the younger generation of workers (Y) than for the older generation (X) (answers to RQ1). Communication with other people through various communication networks successfully replaces personal communication and relations with employees; although important, they are not decisive in job satisfaction. Remuneration is a more important factor in job satisfaction for the younger generation (Y) than for the older generation (X), especially in the context of its compliance with competencies (RQ2). But wages associated with the results of work are as important for them, as for generation X, and is a natural result of the fact that generation Y has no need to prove their value at work (RQ3). The most important factors increasing job satisfaction among young generation (Y) are remuneration and the opportunity to acquire new knowledge and develop skills, stable employment, balance between work and personal life, comfortable working place (RQ4).

The present research is of theoretical and practical importance in professional business management in the region. It indicates which factors are important for the younger generation in the context of achieving job satisfaction compared to the older generation. The study draws attention to the fact that managers within a company should use a variety of management tools, for example, differentiation of motives to meet different needs and incentives for the employees of different age groups.

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PUBLIC OPINION MONITORING

Public Opinion Monitoring of the State of the Russian Society

As in the previous issues, we publish the results of the monitoring of public opinion concerning the state of the Russian society conducted by VolRC RAS in the Vologda Oblast[1].

The following tables show the dynamics of several parameters indicating the social feeling and socio-political sentiment of the Vologda Oblast population in February – April 2019, and also on average for the latest six polls (June 2018 – April 2019).

These data are compared with the data for 2007 (the last year of Vladimir Putin's second presidential term, when the assessment of the President's work was the highest) and for 2011 (the last year of Dmitry Medvedev's presidency).

The yearly dynamics of the data are presented for the last two years (2017–2018).

The main emphasis in the analysis of the data is made on the changes in public opinion that have occurred over the past 10 months (from June 2018 to April 2019). This is due to the fact that in June 2018 the State Duma introduced a bill on reforming the pension system, after which people's estimates on various monitoring indicators (including the attitude toward the work of the President and other authorities) significantly decreased. Thus, the survey data for June 2018 represent an indicator that must be achieved at least in order to "return" to the state of relations between society and the government, which was observed before the implementation of the pension reform.

[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/.

In February – April 2019, the negative trend of decreasing support for the work of the head of state continued, it was observed since June 2018. In general, over the past 10 months (from June 2018 to April 2019), the share of positive assessments decreased by 14 percentage points (from 70 to 56%), negative – increased by 13 percentage points (from 18 to 31%).

Since June 2018, there has been a decrease in the share of positive judgments concerning the Prime Minister's work; by 13 p.p. (from 52 to 39%) for the past 10 months (from June 2018 to April 2019). At the same time, the share of negative assessments for the same period increased by 12 p.p. (from 28 to 40%).

For reference:

The nationwide level of approval of the wok of the head of state from June 2018 to April 2019 decreased by 8 p.p. (from 73 to 65%; according to VTsIOM).

According to Levada-Center, the level of approval of the President's work in May 2018 was 79%. It decreased to 67% (by 12 p.p.) In July 2018, it amounted to 65% in March 2019 (in general, for the period from May 2018 to March 2019 it decreased by 14 p.p.)

How do you assess the current performance of..? (percentage of respondents)

Answer	2007	2011	2012	2017	2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Feb. 2019	Apr. 2019	Average for the latest 6 surveys	Dynamics (+/-) Apr. 2019 to June 2018	Dynamics (+/-) the latest 6 surveys compared to…		
														2017	2011	2007
RF President																
I approve	75.3	58.7	51.7	67.3	66.4	70.1	65.9	63.5	61.9	58.7	55.9	62.7	-14	-5	+4	-13
I don't approve	11.5	25.6	32.6	20.0	21.7	17.5	22.1	24.1	27.0	30.1	31.2	25.3	+14	+5	0	+14
Chairman of the RF Government*																
I approve	-*	59.3	49.6	49.5	48.0	52.0	47.4	45.2	45.3	41.6	38.8	45.1	-13	-4	-14	-
I don't approve	-	24.7	33.3	31.1	31.6	27.5	31.9	34.8	36.9	39.3	40.2	35.1	+13	+4	+10	-
Governor																
I approve	55.8	45.7	41.9	39.8	38.4	40.5	37.3	35.7	38.3	36.5	34.7	37.2	-6	-3	-9	-19
I don't approve	22.2	30.5	33.3	39.3	37.6	35.3	36.9	39.1	40.3	41.5	41.4	39.1	+6	0	+9	+17

* Included in the survey since 2008.

Over the past 10 months (from June 2018 to April 2019), there has been a significant decrease in the number of Vologda Oblast residents who consider the work of the head of state successful in the following fields:

- ✓ strengthening Russia's international position – by 6 p.p. (from 56 to 50%);
- ✓ restoring order in the country – by 13 p.p. (from 55 to 42%);
- ✓ protecting democracy and strengthening freedoms of citizens – by 11 p.p. (from 43 to 32%);
- ✓ economic recovery and welfare growth – by 4 p.p. (from 32 to 28%).

In your opinion, how successful is the RF President in coping with challenging issues?* (% of respondents)

Answer	2007	2011	2012	2017	2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Feb. 2019	Apr. 2019	Average for the latest 6 surveys	Dynamics (+/-) Apr. 2019 to June 2018	Dynamics (+/-) the latest 6 surveys compared to…		
														2017	2011	2007
Strengthening Russia's international standing																
Successful	58.4	46.2	43.1	55.7	54.2	55.6	53.3	51.3	53.5	51.5	50.2	52.6	-5	-3	+6	-6
Unsuccessful	24.9	33.7	37.9	26.8	28.4	26.7	29.1	30.7	30.3	31.7	32.7	30.2	+6	+3	-4	+5
Success index	*133.5*	*112.5*	*105.2*	*129.0*	125.7	*128.9*	*124.2*	*120.6*	*123.2*	*119.8*	*117.5*	*122.4*	*-11*	*-7*	*+10*	*-11*
Imposing order in the country																
Successful	53.2	36.6	35.4	50.6	51.1	55.1	51.0	48.5	46.9	44.2	42.4	48.0	-13	-3	+11	-5
Unsuccessful	34.0	50.0	50.7	36.1	35.0	32.9	36.2	37.9	39.5	40.7	42.6	38.3	+10	+2	-12	+4
Success index	*119.2*	*86.6*	*84.7*	*114.5*	116.1	*122.2*	*114.8*	*110.6*	*107.4*	*103.5*	*99.8*	*109.7*	*-22*	*-5*	*+23*	*-9*
Protecting democracy and strengthening citizens' freedoms																
Successful	44.4	32.4	28.8	40.3	40.5	43.4	39.8	37.3	36.5	33.5	32.3	37.1	-11	-3	+5	-7
Unsuccessful	37.0	48.3	52.3	40.2	40.2	38.1	41.4	42.7	43.3	45.3	47.7	43.1	+10	+3	-5	+6
Success index	*107.4*	*84.1*	*76.5*	*100.2*	100.2	*105.3*	*98.4*	*94.6*	*93.2*	*88.2*	*84.6*	*94.1*	*-21*	*-6*	*+10*	*-13*
Economic recovery and increase in citizens' welfare																
Successful	47.2	30.7	28.5	29.3	31.0	32.3	30.6	30.6	29.9	28.1	28.1	29.9	-4	+1	-1	-17
Unsuccessful	39.1	56.1	57.9	56.9	56.2	55.2	58.3	57.2	57.6	56.9	58.2	57.2	+3	0	+1	+18
Success index	*108.1*	*74.6*	*70.6*	*72.4*	74.7	*77.1*	*72.3*	*73.4*	*72.3*	*71.2*	*69.9*	*72.7*	*-7*	*0*	*-2*	*-35*

* Ranked according to the average value of the index of success for 2016.

In the structure of Vologda Oblast residents' preferences concerning political parties for the period from June 2018 to April 2019, there has been a decline of support for the United Russia PARTY (by 6 p.p., from 39 to 33%) and a marked increase in the proportion of people who believe that none of the political parties represented in the Parliament expresses their interests (by 8 p.p., from 27 to 35%). The positions of the other parliamentary parties have not changed significantly.

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Which party expresses your interests? (% of respondents)

Party	2007	Election to the RF State Duma 2007, fact	2011	Election to the RF State Duma 2011, fact	2012	Election to the RF State Duma 2016, fact	2017	2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Feb. 2019	Apr. 2019	Average for the latest 6 surveys	Dynamics (+/-) Apr. 2019 to June 2018	Dynamics (+/-) the latest 6 surveys compared to…		
																	2017	2011	2007
United Russia	30.2	60.5	31.1	33.4	29.1	38.0	34.7	37.9	38.9	38.1	36.5	36.0	34.6	33.3	36.2	-6	+2	+5	+6
LDPR	7.5	11.0	7.8	15.4	7.8	21.9	11.0	9.6	9.7	9.7	9.7	8.8	8.9	8.2	9.2	-2	-2	+1	+2
KPRF	7.0	9.3	10.3	16.8	10.6	14.2	7.6	9.2	8.7	10.3	11.1	9.9	9.1	8.0	9.5	-1	+2	-1	+3
Just Russia	7.8	8.8	5.6	27.2	6.6	10.8	4.8	2.9	2.3	2.7	3.4	2.8	2.9	2.9	2.8	+1	-2	-3	-5
Other	1.8	–	1.9	–	2.1	–	0.5	0.7	0.5	0.6	0.4	0.4	0.6	0.3	0.5	0	0	-1	-1
None	17.8	–	29.4	–	31.3	–	29.2	28.5	26.7	28.5	29.0	31.9	34.2	34.7	30.8	+8	+2	+1	+13
It's difficult to answer	21.2	–	13.2	–	11.7	–	12.2	11.2	13.3	10.0	9.9	10.2	9.7	12.6	11.0	-1	-1	-2	-10

Over the past 10 months, the proportion of people who characterize their emotional well-being as positive has decreased slightly (by 4 p.p., from 73 to 69%). There has been an increase in the proportion of Vologda Oblast residents who consider themselves to be "poor and extremely poor" (by 2 p.p., from 45 to 47%). The consumer sentiment index decreased by 2 points (from 92 to 90 p.), which indicates a decrease in the positive forecasts of the population regarding the prospects for the development of their own financial situation and the economy as a whole.

Estimation of social condition (percentage of respondents)

Answer	2007	2011	2012	2017	2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Feb. 2019	Apr. 2019	Average for the latest 6 surveys	Dynamics (+/-) Apr. 2019 to June 2018	Dynamics (+/-) the latest 6 surveys compared to…		
														2017	2011	2007
Mood																
Usual condition, good mood	63.6	63.1	67.3	70.4	71.2	72.5	72.5	71.3	70.7	68.0	68.8	70.6	-4	0	+8	+7
I feel stress, anger, fear, depression	27.8	28.9	27.0	24.2	23.1	22.8	22.5	23.1	23.5	25.6	25.5	23.8	+3	0	-5	-4
Stock of patience																
Everything is not so bad; it's difficult to live, but it's possible to stand it	74.1	74.8	76.6	77.7	77.1	76.5	78.0	75.7	77.1	74.3	76.7	76.4	0	-1	+2	+2
It's impossible to bear such plight	13.6	15.3	15.8	15.8	16.3	16.6	15.5	17.1	17.5	19.1	17.5	17.2	+1	+1	+2	+4
Social self-identification*																
The share of people who consider themselves to have average income	48.2	43.1	44.7	43.1	42.3	43.1	43.3	42.8	41.6	43.8	41.3	42.7	-2	0	0	-6
The share of people who consider themselves to be poor and extremely poor	42.4	44.3	44.5	46.6	45.4	45.3	44.1	45.4	44.7	44.8	46.9	45.2	+2	-1	+1	+3
Consumer sentiment index																
Index value, points	105.9	89.6	91.5	84.6	89.9	92.2	89.2	89.2	89.1	90.1	90.0	90.0	-2	+5	0	-16

*Question: "Which category do you belong to, in your opinion?"

From June 2018 to April 2019, there has been no improvement in the social mood in any of the socio-demographic groups. At the same time, negative trends are observed in 9 out of 14 groups. The proportion of people who positively characterize their daily emotional state, especially significantly decreased:

- ✓ among men (by 6 p.p., from 75 to 69%);
- ✓ among persons over 55 years of age and people with secondary and incomplete secondary education (by 5 p.p., from 65 to 60%);
- ✓ among those people who according to their own assessments of their income belong to the top 20% of inhabitants of the Oblast (by 5 p.p., from 86 to 81%);
- ✓ and among the inhabitants of the cities (in Vologda – by 6 p.p., from 75 to 69%, in Cherepovets – by 9 p.p., from 77 to 68%).

Social mood in different social groups (answer: "Good mood, normal condition", % of respondents)

Population group	2007	2011	2012	2017	2018	June 2018	Aug. 2018	Oct. 2018	Dec. 2018	Feb. 2019	Apr. 2019	Average for the latest 6 surveys	Dynamics (+/-) Apr. 2019 to June 2018	Dynamics (+/-) the latest 6 surveys compared to…		
														2017	2011	2007
Sex																
Men	65.9	64.5	69.1	70.6	72.8	74.5	73.9	70.8	73.4	69.9	68.6	71.9	-6	+1	+7	+6
Women	61.7	62.0	65.8	70.2	69.8	70.9	71.3	71.8	68.4	66.4	69.0	69.6	-2	-1	+8	+8
Age																
Under 30	71.3	70.0	72.3	78.1	80.0	81.3	77.9	85.1	81.6	76.3	81.2	80.6	0	+2	+11	+9
30-55	64.8	62.5	67.9	71.5	72.6	75.1	74.9	70.9	71.6	68.0	71.5	72.0	-4	+1	+10	+7
Over 55	54.8	58.3	62.1	64.9	65.2	64.7	66.5	65.4	64.7	64.3	59.8	64.2	-5	-1	+6	+9
Education																
Secondary and incomplete secondary	58.4	57.4	57.2	63.6	64.8	64.8	66.5	63.8	67.8	61.5	60.4	64.1	-4	+1	+7	+6
Secondary vocational	64.6	63.6	66.7	72.0	72.2	74.9	72.6	73.5	70.5	68.6	73.0	72.2	-2	0	+9	+8
Higher and incomplete higher	68.6	68.3	77.0	75.8	76.8	77.4	78.4	76.5	74.1	73.8	73.3	75.6	-4	0	+7	+7
Income groups																
Bottom 20%	51.6	45.3	51.5	52.9	57.3	60.0	53.1	59.6	61.3	50.4	56.1	56.8	-4	+4	+11	+5
Middle 60%	62.9	65.3	68.7	72.0	71.9	72.3	74.5	73.1	69.7	67.2	69.9	71.1	-2	-1	+6	+8
Top 20%	74.9	75.3	81.1	83.7	82.9	85.5	83.4	81.3	83.4	86.2	81.0	83.5	-5	0	+8	+9
Territories																
Vologda	63.1	67.1	73.6	72.6	71.0	75.4	70.4	68.8	67.1	65.5	68.5	69.3	-7	-3	+2	+6
Cherepovets	68.1	71.2	76.2	75.7	75.8	76.7	79.1	77.7	74.5	71.1	67.8	74.5	-9	-1	+3	+6
Districts	61.6	57.1	59.8	66.1	68.7	68.6	69.8	69.2	70.5	67.6	69.6	69.2	+1	+3	+12	+8
Oblast	63.6	63.1	67.3	70.4	71.2	72.5	72.5	71.3	70.7	68.0	68.8	70.6	-4	0	+8	+7

Conclusion

Thus, the dynamics of both national and regional sociological data indicate a significant negative impact of the pension system reform on Russian society. We note that the draft pension reform was submitted to the State Duma and announced to the public in June 2018, after which there was a sharp decline in the share of positive judgments on many indicators (including the traditionally most stable one – the social mood and support for the President's work)

At present, the rate of negative trends has slowed significantly. Nevertheless, the situation looks worse on almost all the monitoring indicators in comparison with June 2018, and so far there are no sustainable positive changes that allow us to talk about the prerequisites for returning to this "pre-crisis" level.

The notable improvement in the social mood among low-income people can be considered an exception: in February – April 2019, the share of positive assessments of the emotional state among people who according to self-assessments of their income belong to the bottom 20% of Vologda Oblast residents increased by 6 p.p. (from 50 to 56%). However, this can be largely due to the adoption of individual strategies for adaptation to difficult economic conditions, and also

due to the approach of the spring-summer (when people work at their dachas) season. At least, there are no significant positive changes in the dynamics of solving the problem of poverty: according to opinion polls, the share of "poor and extremely poor" in February – April 2019 increased from 45 to 47%; according to official data of Vologdastat, real wages in January 2019 amounted to 80.6% of the level of December 2019, while the consumer price index for goods and services has not actually changed – 100.9%.

Against the background of the growing need for change[2], the expectations "for a decisive breakthrough in the preservation of the people of Russia and the well-being of the citizens"[3], and the implementation of the main tasks specified in the national projects[4] become especially acute.

However, the first year after the election of the President of the Russian Federation has not brought any positive changes in the dynamics of the standard of living and quality of life. On the contrary, the pension reform has become a vivid example of decisions that contradict public expectations and experts' assessments, many of which said that it is not necessary[5], that it was carried out incorrectly, like a "special operation"[6], and that it will not bring the desired results[7].

These scientifically substantiated warnings have gone unnoticed by both the Government and the President, so it is not surprising that the pension reform has played the role of a trigger mechanism "to activate more fundamental changes, the consequences of which may last for a long time"[8] (in fact, after their sharp fall in June 2018, no tangible positive changes in the dynamics of public opinion have been observed).

The decisions of the ruling elites that do not correspond to the national interests, that are, in a sense, adventurous, and that are often carried out by the method of "shock therapy" prove that "our officials do not possess the basic technique for carrying out institutional reforms"[9], and this is regarded by many experts as a sign of their "intellectual feebleness"[10]. It is a critical barrier and risk to the existence of V. Putin's "long state"[11] the state, built upon and existing exclusively due to the authority and personal qualities of the President, who, according to the current Constitution of the Russian Federation, in 2024 will have to transfer his powers to his successor.

The materials were prepared by M.V. Morev, I.V. Paranicheva, I.M. Bakhvalova.

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[2] Socio-economic situation in the Vologda Oblast in January – February 2019: report. Vologdastat. 2019. 92 p.

[3] During the period from 2014 to 2018, the share of Russians who believe that change is more important for the country than stability almost doubled (from 30 to 56%; source: Russian society after the 2018 Presidential Election: the request for a change: information and analytical summary. FNISTs RAN. Moscow, 2018. P.7.)

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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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