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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.

MAIN RESEARCH DIRECTIONS

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

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

INTERNATIONAL TIES AND PROJECTS

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

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

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

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

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

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

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

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

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

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

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

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

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Editorial

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Remembering Academician D.S. Lvov with Gratitude

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Editorial. On October 26, 1990, the Academic Council of the Institute for Economic Studies of the Research Center of the Academy of Sciences of the Soviet Union decided to create the Vologda Scientific Coordinating Center as an institutional subdivision. This year marks the 30th anniversary of this event which started the history of the formation and development of the Federal State Budgetary Institution of Sciences "Vologda Research Center of the Russian Academy of Sciences". Many prominent figures of Russian economic, sociological, and other branches of social science played an important role in this constructive process. Academician Dmitry Semenovich Lvov is of special importance (1930–2007). The journal's editor-in-chief, RAS Corresponding Member, Doctor of Sciences (Economics), Professor V.A. Ilyin shared his memories of meetings with D.S. Lvov. In an interview with a chairman of the Council of Young Scientists of FSBIS VolRC RAS A.I. Rossoshanskii, Vladimir Alexandrovich spoke about a creative and business impact of academician D.S. Lvov on progressive advancement of the research team.

* * *

A.I. Rossoshanskii. Vladimir Alexandrovich, you have been a head of the first (and still the only one) institution of academic science in the Vologda Oblast. Since its foundation, you acted as a director, and, over the last few years, you have been its scientific director. In other words, you are the best person to characterize a role of academician D.S. Lvov in the process of development of Your native scientific institution.

Would You, please, tell about your first meeting with Dmitry Semenovich?

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V.A. Ilyin. I would like start with the background of this acquaintance. It is directly related to the initial stages of the formation of VSCC. In December 1993, it was transformed into an independent scientific institution – the Vologda Scientific Coordinating Center – and included into the Economic Department of RAS. In 1996, D.S. Lvov became an academic secretary of this Subdivision. Thus, it is possible to say that I was connected with Dmitry Semenovich by scientific work. Although, even before that, I was familiar with academician D.S. Lvov's scientific authority. I knew that Dmitry Semenovich had worked in the leading research institutes of the Academy for many years, and, before the position of an academic secretary, he was a deputy director of The Central Economic Mathematical Institute of RAS for several years. Among economists, he was revered as the author of fundamental works on the theory of scientific and technical development, the efficiency of factors of production and capital investment. In a post-Soviet scientific community, his speeches on efficient mechanisms for the economy's functioning in the transition period had already received wide resonance. He publicly criticized the targets and methods of market reformation of the Russian economy chosen by the new Russian government.

RAS academician Dmitry Semenovich Lvov at the 5th Regional scientific and practical conference "Strategy and tactics of socio-economic reforms: regional aspect". Vologda, January 25–27, 2006

A.I. Rossoshanskii. What issues were the most discussed ones during the initial period of your professional meetings with academician D.S. Lvov?

V.A. Ilyin. In the mid-90s, as social scientists now say, there was a collapse of radical reforms: after the collapse of the USSR and massive privatization of state property, the country's powerful post-Soviet production potential was on its way to destruction. Russia was in a deep systemic socio-economic crisis. In 1991–1995, the country's gross domestic product decreased by nearly 50%, industrial production – by more than 2 times, agricultural production – by 30%, and capital investment decreased by almost 70%. As the result, people's living standards declined very sharply. In 1995, 37 million people (25% of residents) had incomes below the subsistence level. Similar negative dynamics took place in the Vologda Oblast.

The reasons of this, speaking in detail, were: first, the wrong choice of basic macroeconomic theory reforms which adopted a neoliberal concept – monetarism, based on the theory of self-regulation of the market and minimization of state participation in the economy; second, the implementation of reforms based on mythical theories that private property is always more efficient than state property, and, third, a desire of "reformers" to implement public policy in accordance with these postulates.

Dmitry Semenovich noted with pain that such reasoning is deeply practically inadequate. In mass media and during brilliant public speeches at various forums, he argued that the policy, pursued by domestic liberals, based on the

provisions of the so-called Washington consensus, is hopeless for Russia in socio-economic and socio-political terms. Dmitry Semenovich tried to convey his elaborated vision of the fallacy of goals and methods of transformations, being implemented in Russia, to managers and specialists, representatives of science, and all groups of Russian society.

It was a reason for his initiative, announced at our first meetings, to organize a conference "Strategy and tactics of socio-economic reforms: regional aspect" at the Vologda Scientific Coordinating Center in early 1997.

Dmitry Semenovich took an active part in development of the conference program and the content of its plenary and section sessions. He received consent of a number of leading scientists from academic institutes of the Economic Department of RAS to present reports and presentations on program topics at the conference.

It should be especially noted that this event was supported by the Government of the Vologda Oblast.

The conference was held on January 22–24, 1997. At the first plenary session, conducted in a large conference hall of the Government, Dmitry Semenovich presented a deep report with a very bright speech. At the end of the conference, he positively assessed all sessions. It was agreed that Russian conferences on regional aspects of implementing a strategy and tactics of socio-economic reforms should be held under the auspices of the Economic Department of RAS in Vologda once in two years.

It should be noted that Dmitry Semenovich subsequently (in 2000–2007, he was the head of the Economics section of the Department of Social Sciences of RAS) honored this agreement.

Under his scientific guidance, Russian conferences on aforementioned topics were held in Vologda on March 31–April 3, 1999, January 17–20, 2001, April 2–5, 2003, and January 25–27, 2006. In various years, academicians L.I. Abalkin, A.S. Granberg, V.L. Makarov, V.I. Mayevsky, V.V. Okrepilov, A.I. Tatarkin, and other major scientists engaged in economic, sociological, and other social studies took part and presented reports at these conferences. We may say that academician D.S. Lvov was at the beginning of the scientific discussion platform which now operates on the basis of the Vologda Research Center.

A.I. Rossoshanskii. Vladimir Alexandrovich, please, tell us about the most important ideas that Dmitry Semenovich delivered at these conferences.

V.A. Ilyin. At the first conference, the main point of his speech was the presentation of Russia

D.S. Lvov at the 2nd Russian scientific and practical conference "Strategy and tactics of socio-economic reforms: regional aspect". Vologda, March 31 – April 2, 1999

D.S. Lvov at the 3rd Russian scientific and practical conference "Strategy and tactics of implementing socio-economic reforms: regional aspect". Vologda, January 17–20, 2001

as a huge storehouse of natural resources which was used strategically unsatisfactorily due to the usage of inefficient economic mechanisms. He said that "in a value of the gross product produced in Russia, 75% is accumulated by natural resources, but the treasury receives only a half of real income". The rest is deducted from the tax system by unscrupulous businesses, various intermediaries, and criminals. Academician convinced the audience that the income from natural resources should belong to everyone. The state should withdraw natural rents from those who became oligarchs during privatization distribution of the country's natural resources and distribute it among all citizens. He presented the concept of national property management developed under his leadership. Its essence was the need to direct the rent, paid by mining enterprises, to national funds – to finance education, health, and other social needs and requirements.

Dmitry Semenovich's another fundamental idea was that a main disparity, hindering economic growth and negatively affecting the quality of domestic economy, is an unacceptably low level of employees' wages in Russia. He cited the following data: in terms of average hourly labor productivity, Russia is behind the United States by nearly 3.6 times, and, in terms of hourly wages in dollar equivalent, it lags behind the United States by 9.6 times. Our salary, as Dmitry Semenovich noted, is low not in general but in relation to our low productivity. Lvov rejected a stereotypical thesis that "we live bad because we work bad" and stated that "in fact, we work bad because we live bad". He believed that it is necessary to sharply increase salaries, a salary volume should be as close as possible to the level of developed Western countries in terms of its share".

Unfortunately, his proposals were ignored by Russian authorities at that time, and the economic and social situation in the country deteriorated. In August 1998, a default of virtually unprofessional origin broke out in Russia. In 1999, the government of E.M. Primakov managed to get out of it due to a purely more pragmatic approach and increased prices on the global market of oil and gas resources – main products of Russian exports.

However, this government was soon dismissed by the President B.N. Yeltsin. The country continued to develop mechanisms that did not ensure stable development.

Dmitry Semenovich spoke with pain about negative consequences of this process at conferences, held in Vologda, during his lifetime. His predictions in this regard turned out to be prophetic.

D.S. Lvov at the 4th Russian scientific and practical conference "Strategy and tactics of socio-economic reforms: regional aspect". Vologda, April 2–5, 2003

Let us look at the dynamics of Russia's economic and social development over the past twenty years. V.V. Putin, after his first presidential election in 2000, partially seized oligarchs' natural rents. Together with a monotonous growth of oil and gas prices in 2000–2007, authorities managed to improve the country's economic situation to a certain extent and significantly increase incomes of main population groups. However, a global economic crisis, which took place in 2008, led to the fact that, in 2009, Russia's most important economic and social indicators declined more than in other major countries. It was shown by unilateral orientation of the state toward fuel and energy resources' export, a high pre-crisis inflation, and inefficient financial policy based on monetarist principles. Later, when the crisis' bottom was behind, necessary drastic changes in activities of authorities did not occur. After that, the situation began to change for the worse even faster. The growth of the country's GDP in 2017–2019 was 1–2%. Since 2014, the population's real incomes have been declining. At the same time, welfare of a relatively narrow group of oligarchs and large entrepreneurs grows. Additional difficulties for development of our economy are created by American and European anti-Russian sanctions related to the return of the Crimea by Russia. The coronavirus epidemic has brought us serious losses.

The need for a sharp increase of the level and quality of public administration, a significant adjustment of the current political course and applied economic mechanisms becomes more relevant.

A.I. Rossoshanskii. Vladimir Alexandrovich, what are the most important and currently relevant lessons of D.S. Lvov?

V.A. Ilyin. Dmitry Semenovich expressed his views and proposals on development of our country in his works of the 2000s in the most concentrated way. Among them, I would like to highlight "Economic Manifesto: Future of the Russian Economy" (2000), "Economic Development and Challenges of Economic Science" (2001), "Development Economics" (2002), "Economic Growth and the Economic Quality" (2004), "Moral Economy" (2004), "Russia: Framework of Reality and Contours of Future" (2007). A list of his remarkable and relevant scientific works is, of course, much longer.

Expressing deep concerns about the results of economic reforms in Russia, he wrote and said: "our trouble is that, in practice, many elements and mechanisms of the economic system, which are focused on ensuring humanistic ideals, were crossed out and discarded. Although the

D.S. Lvov (on the left) and the Governor of the Vologda Oblast (1996—2011) V.E. Pozgalev. Vologda, January 25–27, 2006

Academicians D.S. Lvov (on the right) and A.I. Tatarkin at the 5th Regional scientific and practical conference "Strategy and tactics of socio-economic reforms: regional aspect". Vologda, January 25–27, 2006

Constitution of the Russian Federation, as noted by Dmitry Semenovich, includes values of a socially-oriented, legal state, a real situation severely contradicts it. There is a collapse of the system of social guarantees and the expansion of social polarization".

D.S. Lvov formulated the main criteria for assessing a degree of a long-term social development. He highlighted that "**we must clearly declare that our goal will be the economy with a main driving force that is fundamentally different from a market society of mass consumption. Instead of aspirations for wealth and its symbolic manifestations, there should be an aspiration toward a high quality of life. This quality cannot be achieved individually, without a simultaneous improvement of others' quality of life. In other words, the quality of life of a society should be determined by a variety of life benefits that can be guaranteed to each of its members, including a benefit to work not just for earning money. A benefit of personal time, free from work for the sake of earning money, too. This guaranteed package should ultimately measure the quality of the economy**".

A.I. Rossoshanskii. During his travels to Vologda to visit scientific events, did Dmitry Semenovich find time to get acquainted with activities of specific enterprises and to view historical and cultural monuments of the Vologda Oblast?

V.A. Ilyin. He considered it a necessary part of his visits. First of all, he was interested in the situation with the production of innovative products at enterprises. Dmitry Semenovich several times visited opto-mechanical and bearing plants, the Dairy Farming Academy, the Cherepovets Metallurgical Combine, and a number of other industries that introduce new technologies and equipment. At the same time, he objectively assessed what he saw and made meaningful recommendations for improving these activities. And, of course, as a highly

OAO "Severnoe moloko",
Gryazovets, April 2, 2003

Members of the Economic section
of the Department of Social Sciences of RAS
and directors of RAS economic institutions,
headed by D.S. Lvov, visit enterprises of the Vologda Oblast

OAO "Sokol'skiy DOK",
Sokol, January 17–20, 2001

ZAO Plemzavod "Zarya",
Vologda region, April 2, 2003

spiritual person, he was interested in the history of our Northern region, recreated in the Vologda museums.

He was particularly impressed by his visit to the Kirillo-Belozersky Monastery – the center of spiritual life in the Russian North. Dmitry Semenovich attached great importance to meetings with regional heads and the heads of the regional center. During these meetings, he basically studied the state and level of efficiency of regional and municipal government bodies.

A.I. Rossoshanskii. How did Dmitry Semenovich's regular participation in scientific and practical conferences, your meetings, and professional contacts with him influence subsequent activities of the Vologda Research Center?

V.A. Ilyin. A role of D.S. Lvov for our team was a very significant in a long-term perspective.

His personal participation in events, conducted at our Center, contributed to the growing fame of our team. To say frankly, the authority of the heads of the institution increased. And, most importantly, our researchers' positions in the community of Russian scientists and economists were consolidated.

Dmitry Semenovich's presence at scientific events in the Vologda Oblast attracted the participation of the heads and renowned researchers of academic economic institutions of Moscow, St. Petersburg, Yekaterinburg, the Murmansk Oblast, Komi and Karelia Republics, and other Russian regions. Because of this, mutual scientific contacts were established and developed, and research experience was exchanged. Now, these relationships have become even more meaningful and creative.

I would also like to emphasize that Dmitry Semenovich's ideas became a foundation for the formation of a promising research topic for our team's works. These include, first of all, scientific products related to the study of ways to improve the population's quality of life in regional and national aspects, to advance a level of public administration, rational construction of the budget system. The relevance of this topic played a very significant role in increasing a number of candidate and doctoral theses defended by our employees.

During his visits, Dmitry Semenovich expressed satisfaction with the fact that young people constantly join our research center. He believed that it is impossible to accelerate development of the country without turning to the knowledge economy, where the results of

D.S. Lvov's meeting with the heads of the Oblast and the Oblast's center. Vologda, April 4, 2003

3rd Russian scientific and practical conference "Strategy and tactics of socio-economic reforms: regional aspect". Vologda, January 17–20, 2001. D.S. Lvov talks with a postgraduate student of VSCC D.N. Kozhin (currently, D.N. Kozhin is the head of the Department of education quality management and innovative technologies in the Vologda Institute of Law and Economics, Lt. Colonel of the internal service)

activities of scientists, specialists, and innovators are of primary value. He sais that "the whole system of the social structure should be aimed at strengthening a role and importance of creators of new knowledge, technologies, products, and services that fundamentally change the direction of formation and structure of the usage of national income".

I would like to note another fundamental feature of Dmitry Semenovich as a scientist: a systematic approach was natural for him. He constantly emphasized that the results of the country's socio-economic development as a whole consist of the results of activities of its regions, which are very diverse in terms of resources and usage conditions in Russia.

This insight was clearly reflected in his views and actions in the field of organizational structure of economic science institutions. He considered it necessary to increase a spatial scale of economic studies and provided constant assistance to development of economic institutions of RAS located in Russian regions. In reports on activities of the Economic Department of RAS, there was the expansion of the representation of the most significant works performed by non-capital institutions on development of socio-economic policies and efficient functioning of Russian territorial systems. This list also included achievements of Vologda scientists. It was a peculiar assessment of positive qualitative developments in activities of economic science structures, operating in specific conditions that develop in certain federal districts, republics, krais, and oblasts of Russia.

D.S. Lvov was not a cabinet scientist. Throughout his life, he lectured students and participated in educational programs on radio and television. He presented his vision of current and upcoming challenges of Russia's development at meetings of the national parliament's chambers, the Russian government, ministries, and departments.

Dmitry Semenovich was a remarkable speaker, who showed his intellectual wealth in his speeches. He had a striking ability to attract like-minded people. Most listeners of his public speeches momentarily turned into his spiritual supporters.

In February 2020, the 90th anniversary of academician's birth was held. In July, it will be 13 years since his death. However, Dmitry Semenovich's scientific statements and conclusions about the content of the strategy and tactics of socio-economic transformations in Russia become more relevant and practical.

I. Rossoshanskii. Vladimir Alexandrovich, thank you for this interview about an outstanding scientist and a remarkable man who played a significant role in the formation of the Vologda Research Center of the Russian Academy of Sciences. VolRC RAS, primarily following D.S. Lvov's principles, is currently among the scientific leaders of the Russian Federation.

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Import of Institutions: Theoretical Aspect and Practical Experience*

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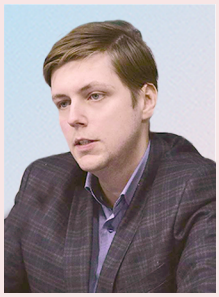

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Abstract. The article is devoted to the problem of import of institutions, which is manifested in the form of society's borrowing of traditions, customs, and norms of behavior that developed in a different institutional environment. Such import is quite often accompanied by atrophy, regeneration of institutions and dysfunction of institutional macrostructure. Emerging so-called institutional traps cause serious risks for development of recipient countries. A historical example of the implementation of such risks was an attempt to transplant institutions of orthodox or radical liberalism in post-Soviet countries which expected modernization of their economies but received a diametrically opposite result – the primitivization of structures. An alternative to this course of events could be the usage of social market economy institutions (SME). Since the essence of the SME concept is a combination of market self-regulation mechanisms

* The article is prepared according to the results of studies conducted at the expense of budget funds in accordance with the state assignment of Financial University under the Government of the Russian Federation on the topic "Participation of Russia in export and import of institutes".

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with a systematic state interventionism, it was possible to carry out a systemic transformation with, first, lower social costs and, second, without total deindustrialization. There is an existing need for a broader perspective on the formation of market equilibrium, which implies the inclusion in a number of independent market entities of the state that seeks to maximize its own function of social utility. It is the only approach that ensures the optimization of modern society's institutional environment in general and criteria for selecting imported institutions in particular. The novelty of the work is the justification of considering the interdependence of an exporting country's institutions, while choosing the most efficient one, and the need to assess consequences of its implementation in a recipient state's institutional environment. The authors conclude that the import of corresponding institutions should be accompanied by a synthesis of "social" and "market". It could be achieved only with the harmony of complementarity of both these aspects, not with the construction of a hierarchy between them.

Key words: transplantation of institutions, institutional traps, market of institutions, social market economy, neoliberalism.

Introduction

Social institutions were formed as a component of a particular type of production relations, inherent for different production methods, after centuries of evolution. In the process of institutional transformation, a society tries to reduce transaction costs: K. Arrow called it "costs of exploitation of economic systems" [1, p. 55]. The increase of transaction costs historically strengthens prerequisites for the destruction of old institutions and the formation of new ones which were developed within the system or borrowed from the outside.

Institutions primarily evolve spontaneously under the influence of various socio-economic factors; they arise "from below", and the state enshrines them. However, the introduction of institutions may be violent. In this case, the ruling class, with the help of the state, imposes new (usually radically new) norms of behavior on an entire society. In this situation, a common case is the import of institutions as an attempt to build social relations that are considered more developed and efficient in a short time with the help of ready-made recipes. After it, as A. Oleynik notes, the role of the state, instead of a purely technical one which is reduced to a formal, legal consolidation of relations of class forces, becomes dominant [2, p. 43].

Such replacement process is inextricably linked to the institution market. Inside of it, the elimination of weak institutions contributes to the survival of ones that provide the greatest efficiency in coordinating actions of economic entities [3, p. 17]. In the institution market, the role of peculiar goods is played by formal institutions and forms of their consolidation. At the same time, informal institutions cannot be the object of purchase and sale, and they appear as the result of the reaction to the movement of formal norms and rules. Demand in the institution market is created by different economic entities: the state, forms, households, etc. For them, the basis of the consumer value of "good-institute" is the possibility of the reduction and increase of transaction costs.

The desire to maximize profits will push economic agents toward reducing costs, including transaction ones. In this case, coordination institutions, such as the protection of private property, freedom of pricing, freedom of capital movement, transparency, and stability of public administration, will be in demand.

When an agent tries to gain advantages (rent) by increasing transaction costs of other participants in the economy, it will put a demand on appropriate distribution institutions: restriction of competition, foreign trade duties, market barriers, exchange rate management, and so on. The offer in the market of formal institutions is traditionally presented by state authorities, and the competition arises between sellers. A winner of a competition is a supplier of institutions who was able to ensure a minimum conflict between formal and informal rules and regulations in own practice. When they do not contradict each other, costs of monitoring compliance with formal rules of a game reduce, decreasing costs of its creation. If such a conflict exists, costs of an offer increase, and the process of implementing an institute becomes more complex. Institutional transactions (the concept introduced by D. Bromley [4, p. 110]) – acts of "purchase and sale" in the institution market, carried out through informal contracts – occur when the introduction of an institution leads to the reduction of transaction costs or the increase of rents for a rational buyer.

Issues of the import of institutions in the context of the role of a state are reviewed by I. Rozhdestvenskaya and V. Tambovtsev [5]. Methodological approaches to an issue of importing institutions and related categories (borrowing, transplantation, cultivation, etc.) were studied by E. Kapoguzov, S. Levin, and K. Sablin [6]. M. Zharikov's work is devoted to contradictions of institutions' import by developing countries with a high rate of economic growth using BRICS countries as an example [7]. This research is devoted to issues of borrowing institutions using problems of the Russian socio-economic model, caused by contradictions in the transplantation of institutions of orthodox or radical liberalism in the post-Soviet period, as an example.

Costs of institutions' transplantation

Borrowing of institutions, developed in a different institutional environment, V.M. Polterovich calls "transplantation" [8, p. 24]. Transplantation and import of institutions are similar terms. However, it would be correct to represent both concepts as phenomena depending on each another. Just as abroad import of goods does not mean its automatic consumption in a buyer's country, "import" of certain rules from an outside world requires its further "implantation" in an organism of national economy and the creation of conditions under which it will not be rejected. The choice of an implant is a market procedure when a recipient (country) purchases a necessary product on the institution market. At the same time, the institution market is subjected to much greater deviations than traditional markets of material goods or services. For this reason, a special role in the transplantation process belongs to non-market forces – to a state especially. Here, one of main problems is the influence on a procedure of selecting institutions, required by agents with different interests, and the establishment of criteria for selecting institutions: which institutions, and from which countries, it is necessary (and even possible) to import.

Usually, import of institutions means borrowing of traditions of a developed country by an underdeveloped one. However, it is often difficult to determine the hierarchy of institutions in terms of its development. It applies to political systems (which country has better developed democracy: one where formal signs of political competition and change of power are observed, or one where people from a social bottom have real opportunities to reach the highest state posts?) and economic models (does an institution of private property always act as a guarantor of political freedom

and democracy, or, on the contrary, it creates conditions for the formation of a monopoly dictate?).

G.B. Kleiner, speaking about the quality of institutions, evaluates it from the point of view of the integrity of an institutional system [9, p. 112]. It is understood as a complete interaction and close connection of elements of an institutional system that ensures sustainable socio-economic development of the country, as well as its compliance with the general vector of historical institutional development of this society. This, on the one hand, allows us to evaluate an institutional system in terms of harmonious interaction with cultural, national, historical, and cognitive systems. On the other hand, it restricts a degree of freedom of an institutional system during its transformations. If these conditions are not met, institutions are borrowed in the form of individual fragments of other countries' socio-economic models. As the result, unstable "quasi-institutions" are formed, which are able to perform only a small part of expected functions. G.B. Kleiner notes that such institutions are more like prosthesis than an implant [9, p. 86]. In this regard, institutional design and the creation of tools for institutional stabilization begin to play a particularly important role in the process of institutional transformation. If these conditions are not met, institutional prosthesis may be rejected by society and completely cease to perform expected functions.

According to V.M. Polterovich [10, p. 28], a transplanted institution's atrophy and rebirth occur if it is introduced without coordination with local cultural traditions and an institutional structure of a country. For example, the institution of bankruptcy in the process of transplantation into the model of peripheral capitalism in Russia turned from a tool for improving the efficiency of a system to a way of property appropriation. J. Eaton [11, p. 1310] highlights another example of inefficient transplantation of institutions – the transfer paradox, which means that, as the result of importing an institute, a seller increases gains at the expense of a recipient. For example, the liberalization of economic relations in Russia in the 1990s, when the export of Russian raw materials at low prices, capital outflows, and "brain drain" enriched suppliers of free market institutions by draining the Russian economy.

Since the institution market allows borrowing mostly formal norms and rules, informal institutions' efficiency decreases during its introduction into different environment. As noted by P. Milgrom, D. North, and B. Weingast [12, p. 15], informal institutions are inherently rigid and difficult to transform under the influence of imported formal ones. Rather, on the contrary, informal institutions significantly transform formal ones, and a radical change of institutional environment, especially a short-term one, is practically impossible.

In works of American institutionalists D. North and R. Thomas, the "optimistic" model of institutional evolution was developed. It implies smoothing out differences of economic development, reducing transaction costs, and increasing economic growth for less developed economies as these economies apply imported institutions of developed societies. At the same time, it is noted that borrowing of formal rules is not a problem. However, "the mere existence of such formal rules does not guarantee the efficiency of adaptation", and it does not always contribute to economic growth [13, p. 315]. Development of informal norms and rules, which are not just a simple addition to formal relationships, is equally important. It forms unique environment where the same formal rules begin to operate in different ways.

For example, a number of Latin American countries adopted constitutions based on the main law of the United States after becoming independent. Sovereign states also copied the United States' legal system, but their development took different paths. "Creation of efficient investment and commodity markets is a complex process. The only thing we know is that the creation of such markets requires the addition of informal restrictions and efficient means of enforcing contracts' compliance to formal rules" [13, p. 315].

North tries to answer a question why the smoothing of differences between economies of different levels does not always occur, and development of different societies may often go down diverging paths. At the same time, socio-economic systems tend to reproduce inefficient institutions that may lead to stagnation and decline.

The first reason is an inefficient state. Within the ever-deepening division of labor and specialization, it becomes impossible to reduce transaction costs without a state's active participation. This will not happen if a state does not ensure compliance with rules and regulations but behaves like a "predator", increasing its own income. Often, the less efficient institutions are, the greater higher bureaucracy's revenues become. This is particularly relevant in matters of the property rights' structure, "which, although inefficient, is easier to control, and it creates more opportunities for tax collection" [14, p. 5]. Without sufficient socio-political activity of "bottoms", institutions, borrowed from a society, will not operate efficiently: "Protection and enforcement of property rights are assumed by governments, since they can do this at a lower cost than voluntary informal groups. However, government's financial needs may cause the protection of certain property rights that will hinder, rather than promote, economic growth. Therefore, we have no guarantees that productive options for institutional arrangements will actually emerge" – North and Thomas note [13, p. 48].

The second obstacle to efficient borrowing of institutions is the influence of strong political groups on the legislative process. There is an asymmetry of interests between these groups and a society. As North writes, "even if rulers would want to pass laws based on efficiency considerations, self-preservation interests would dictate a different course of actions, since efficient rules may infringe on interests of strong political groups" [14, p. 72].

The third obstacle is the problem of "path dependence", which often dominates implemented institutions. Old, previously established norms and rules are more easily accepted by the public consciousness than the adoption of new ones. The introduction of new institutions requires significant financial investments, even when old institutions clearly become inefficient and bring constantly increasing transaction costs. A similar point of view is shared by E. Furubotn and S. Pejovich. They note that "new property rights are created, and existing ones change when some individuals and groups believe that it is more profitable for them to rebuild the system, and they agree to bear costs of its implementation" [15, p. 8].

Institutional traps

The choice of erroneous strategies in implementing institutional reforms creates negative effects called institutional traps. These are "inefficient but stable norms or institutions" and "inefficient balances generated by the corresponding norm" [16, p. 5]. An example is the tax evasion system. This norm becomes stable if it becomes unprofitable for economic agents to deviate from it. There is a coordination effect: the more participants of the economy

follow established rules, the lower transaction costs of each one are, despite the fact that an economic system may suffer damage. For example, the more companies evade taxes, the lower the risk of liability for each one is. At the same time, the refusal to follow accepted norm creates a special type of costs – transformational. Such costs will be incurred by a company that wants to work "in the white zone", and it bears additional costs for finding similar contractors. "Over time, transaction costs < ... > decrease due to the learning effect: agents acquire skills and invent technologies that reduce costs" [16, p. 7]. To get out of the institutional trap, a state must use economic regulation policies to create a situation when transformational costs are lower than transaction costs. On the one hand, it could be achieved through increasing transaction costs of an inefficient norm by increasing liability for lawbreakers and improving the efficient work of supervisory authorities; on the other hand, through simplifying transactions, making legislation more transparent, supporting honest business, and so on. According to V. M. Polterovich, a society can independently overcome institutional traps by developing a civil culture [16, p. 11].

Institutional traps also might include the problem of the misusage of institutions. It occurs when an institution, which was originally a source of a public good, becomes an instrument for extracting rents in individual agents' hands. This includes manipulation and subordination of institutions, exploitation of information asymmetry [18, p. 12]. As an example, it is possible to mention the institute of tax incentives, which exists to exempt economic agents from a number of tax obligations. Opportunistic behavior of individual taxpayers might be expressed in an attempt to avoid paying taxes: a company takes steps that are not determined by the logic, or goals, of a business but allow it to formally meet the criteria of the recipient of benefits and enjoy privileges intended for other market participants. The emergence of institutional traps is directly related to costs of failed imports of institutions. Thus, the institute of bank deposits' insurance, which was initially considered a mechanism for protecting interests of ordinary bank customers and increasing their confidence in the stability of the banking system, has become a tool for enriching bank insiders and unscrupulous depositors. As the result, this led to the increase of social costs, not its reduction.

Selection of institutions: expectations and results

To assess the impact of imported institutions on the results of market reforms in post-socialist countries in general and, in particular, in Russia, it is necessary to take into account the institutional background of their socio-economic dynamics. It is about legal norms, cultural traditions, values, and moral guidelines, i.e. formal and informal rules adopted in a particular society. They have had a significant impact on motives and intentions of reformers in the process of transforming one system into another.

Mechanical borrowing of norms and rules, developed in a different cultural environment and other conditions, may be not only ineffective but absolutely counterproductive in terms of expected reforms' results. Significant differences between formal and informal rules play a crucial role here. Informal restrictions cannot change quickly, because they are based on stable patterns of thinking and, consequently, behavior. While formal rules can be changed quickly and radically, informal ones tend to be conservative. This circumstance undermines chances for a beneficial rooting of borrowed institutions.

It is no exaggeration to say that unexpectedly high social cost of Russian transformation (for reformers) is largely caused by the neglect of an institutional component in the design and implementation of the "transit" policy from one system to another. It is not just that the country's economy has grown, averagely, just by one percent a year over several years of reforms, which is why Russia is among the most underdeveloped countries in terms of economic dynamics. It is not yet possible to stop the processes of primitivization of production, de-intellectualization of labor, and degradation of the social sphere in the country. It should also include the appearance of mass poverty which, during the years of radical changes, rapidly expanded due to the erosion of the middle class established in the late Soviet Union: although it was not too rich by Western standards [19, p. 177].

Various studies of material capabilities of Russian households show that only a quarter of the country's population actually enjoys the fruits of conducted reforms, and a half of the country's residents fight the same severe battle for existence similar to Soviet times. It is not surprising that concepts of democracy, market, and freedom are still largely discredited in the Russian public consciousness.

The error of "spontaneity", or the dysfunction of institutions' exogenous borrowing, is also natural for Eastern European countries. However, in Russia, the reform policy, based on the dogma of the free market, due to certain features of the public consciousness, has become particularly unsuccessful, which once again confirms serious risks of importing institutions without taking into account informal rules, characteristic for a recipient country.

A good example of this "neglect" in the post-Soviet Russia is the privatization of state property carried out in a way that it was impossible to give it legitimacy, to create an efficient owner, to prevent a series of seizures and redistributions of property, and to avoid the conjuncture re-statism (e.g. return nationalization) of ownership. Reforms failed to create stable state, social, economic, and law enforcement institutions designed to ensure the independence of property from the state – to overcome a historical supremacy of power over property.

What are benefits of institutions derived from the concept of social market economy today?

Was there any reasonable alternative to this course of events? Our answer is "yes, there was". Everything could be different if the policy of market reforms was based, instead of the ideology of radical liberalism, on, for example, the pragmatic concept of social market economy (SOME) [20, p.100].

The fundamental idea of SOME, which definitely could be considered highly relevant for our time, is the recognition of the equivalence of mechanisms of market self-regulation and state interventionism. Taking into account this kind of "principle of equivalence" has, we can say, an existential significance for current Russia, where a culture of compromises and consensuses is being instilled with great difficulty, and discussions often lead to ideological skirmishes that are similar to a Manichean confrontation between good and evil. The SOME concept and, consequently, the practice of its application in FRG could be extremely useful while choosing the way of Russia's transition from a centrally managed economy to a market one.

It is necessary to understand that such comparisons are very conditional. Each country is unique, as are conditions for the solution of the same tasks; so we should be very careful about conclusions, especially those that are

willingly, or unwittingly, given a universal nature. Still, if there was the need to learn from the experience of others, the most appropriate object in this regard might be post-war West Germany.

The similarity of initial conditions for systemic transformation in FRG and post-Soviet Russia is obvious. First, both countries needed to transition from totalitarian political regimes to systems of pluralistic democracy and a simultaneous formation of a market-based economy. Secondly, in both countries, this kind of a hybrid transition was inevitably accompanied by a material stratification of a society and the decrease of low living standards among the majority of citizens. Consequently, in both countries, it was necessary to implement some kind of a social policy that mitigated hardships of reforms. Third, finally, economic and social policy within the systemic transformation required, at least, some theoretical basis. For this, the SOME concept, which, as it is widely known, enjoyed an impeccable reputation in Europe, in its academic community, and the business world for almost a quarter of a century.

Risks of "non-adjective" market economy

It seemed that time-tested successful story of the theory and practice of SOME would attract the attention of Russian reformers who took up a great task of transforming the country into a modern democratic state with a market economy. However, it did not happen.

The fact is that, after the Great Depression (1929–1933) and the Second World War, anti-capitalist sentiments reigned in the academic world of Europe, while, forty years later, when the systemic transformation of post-socialist countries began, the "spirit of the time" in the world was fundamentally different. The ideological trend changed into an opposite one: a previous rejection of the "free market" turned into its nearly unconditional adoration, which was greatly facilitated, of course, by the collapse of the world socialist system. At the same time, anti-socialist sentiments in Western intellectual elites in the early 80's were so strong that a mere mention of an adjective "social" in a positive connotation was considered somewhat indecent.

It has become accepted that the market economy, if it is efficient, is itself social and, therefore, it does not need to be further defined. Translated from literal German, it sounds like a "non-adjective" market economy (adjektivlose Marktwirtschaft). It is peculiar that, under the pressure of radical liberalism, Germans themselves succumb to the new fashion. A significant part of the German academic community commits some kind of "betrayal" of SOME ideals, rejecting the concept of "social".

All of this, as noted above, led to sad consequences for transformation processes in CEE and CIS countries, which, in our opinion, had to deal with a phenomenon called "historical bad luck". Transition to freedom, democracy, and the market of former socialist countries began at the height of the popularity, if not adoration, of the radical liberalism ideology – unregulated market economy. Within nearly unconditional acceptance of currently prevailing Western theoretical constructs, this circumstance became, paradoxically, a powerful factor that prevents countries from approaching well-being standards of founding states of the European Union.

Obviously, in such circumstances, there could be no question on the demand for the SOME concept by post-socialist countries' elites, especially since international institutions that protected their transit to the market (the IMF and IBRD) were carriers of ideas of market fundamentalism. Isn't it reasonable to assume that, if the transition to the market had

taken place here in the middle of the 60s (the Kosygin reform and the Prague Spring), the content of the system transformation would have been fundamentally different? In any case, its social price would have been clearly lower, at least due to the "spirit of the times" that favored justice and freedom which, in fact, is the essence of SOME. The rejection of the social market economy concept had to affect the choice of imported institutions designed to provide the most efficient way of transforming the planned economy into the market economy. As the result, the transplantation of "market" institutions, so to speak, while ignoring "social" ones, turned into an institutional trap.

In our opinion, the most serious miscalculation of domestic reformers was the adoption of a thesis about the harm of social equalization institutions designed to alleviate the hardships of an objectively painful transition from the directive-planned economy to the market one. If the SOME concept implied the mandatory introduction of a progressive tax scale of personal income from the beginning of systemic changes, Russia decided to abandon this institution in order to follow a neoliberal principle of the inequality right, which gained popularity during M. Thatcher's reforms. As the result, income and property inequality in the country was restored, and, moreover, it significantly increased. Before the collapse of the Soviet Union, the average income of 10 percent of the wealthiest citizens was 3 times higher than the average income of 10 percent of the country's poorest population, and, currently, this figure has increased to 15. In countries that are committed to principles of SOME (Western and Northern Europe) and considered exemplary from the point of view of organizing a community, the gap between incomes of rich and poor people is 6–7 times [17, p. 96]. Consequently, the neglect of the social equalization institution led to the fact that the USSR' excessive income inequality was replaced by excessive income inequality in post-Soviet Russia with all previously mentioned negative consequences.

This is just one example of the failed implementation of a "progressive" institution in a reformed economy, which, instead of the expected sustainable development, acquires an opposite, negative dynamics. The same thing happened in Russia with the competition institution. Reformers assumed that it would work on its own after the abolition of directive pricing, the state monopoly on foreign economic activity, and the introduction of private ownership of production means. In fact, it quickly became clear that, without creating a strong competitive institutional environment, the cartelization of the reformed economy is inevitable, which devaluates and discredits basically irreplaceable market mechanisms of self-regulation in the public's view. Government's relentless attempts to extend principles of self-sufficiency and self-financing to so-called humanitarian sector of the economy, which includes education, health, science, and culture, deserve to be mentioned specifically among cases of discrediting mechanisms of the "free market". Disregard for the meritorious nature of locally produced goods leads to its chronic underfunding by the state, which, in turn, blocks development of the country's human potential and slows down the process of its real modernization.

Conclusions

This paper is devoted to theoretical aspects of the problem of importing institutions and their practical manifestation with the example of market reforms in Russia in the 1990s. The results of the research show that it would be useful to draw the following lessons from the Russian practice of borrowing Western

institutions. No matter how promising an imported institution may seem, no matter where it comes from, its transfer will do more harm than good if a country does not have an appropriate institutional environment consisting of formal and informal domestic rules. In addition, it is necessary to exclude any ideological preferences while choosing an institution for import. Differences between orthodox and, so to speak, social liberalism, as a synonym of the SOME concept, should not be taken into account, especially since, in essence, orthodox liberalism is just the first part of this concept. In other words, social liberalism is nothing more than a continuation of orthodox liberalism, where institutions of freedom merge with institutions of justice. After receiving an adjective "social", liberalism becomes not just a complete doctrine but also, and it is especially important in this case, a pragmatic concept that offers the state various (sometimes diametrically opposite) options for economic policy. Under such conditions, the ground for simplistic representations of reality disappears, and certain dilemmas become meaningless: everything should be privatized or nationalized; everything should be regulated or deregulated; freedom or security; efficiency or justice. An only non-alternative imperative here is to find an optimal balance, being another the state's responsibility, which has to meet society's needs.

Theoretical economic studies in Western and Eastern countries has recently recognized the existence of a special public interest that is not limited to interests of private economic entities. In this regard, a new interpretation is given to the participation of a state in the modern economy and the formation of its institutional environment [21, p. 55]. It no longer just intervenes the society's economic life but acts as an equal market player in it, seeking to realize this special irreducible public interest. In other words, there is a real need for a broader view on the formation of market equilibrium that implies the inclusion of a state, seeking to maximize its own function of social utility, in a number of independent market subjects. This is an only approach that ensures the optimization of an institutional environment of modern society and criteria for selecting imported institutions.

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Preferential Regimes of Established Local Growth Points and Its Impact on the Economy of the Far East

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Abstract. The successful experience of France in implementing the concept of "growth poles" by F. Perroux led to the widespread usage of polarized development ideas in the elaboration of spatial strategies. The Russian Far East (FE) has accumulated considerable, and rather contradictory, experience of creating local growth points. The purpose of the study is to analyze the Far East's experience of forming local zones with preferential economic regimes, to identify problems of its implementation, and to assess the impact of special local zones' regimes on the economy of the macro-region. The analysis of the performance of local zones' functioning was based on the assessment of the degree of achieving targets for creating local "growth points". The assessment of the impact of local zones on the economy of FE was based on a comparative analysis of enterprises' demographics, changes in the revenue structure of consolidated budgets of Far Eastern regions, and the quality of regional finances for 2013–2019. The implementation of these approaches showed that the business climate of Far Eastern local zones has a positive nature for its residents, but it has not yet been established; in the absence of a clear position of the state concerning the formation of propulsive industries in most local areas, anchor projects do not have a propulsive nature, and a significant number of small and medium enterprises is loosely connected with enterprises-leaders of zones. Orientation of specialization of Far Eastern local zones toward domestic demand and import substitution, which is objectively formed within the sanctions war, can slow down its export specialization; preferential climate of local zones has no obvious positive impact on the business climate of Far Eastern entities of the Federation, and the growing number of residents with preferential

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business conditions in local zones dissonant with demographics of FE enterprises. There is a deterioration of the quality of regional finances and the decrease of the taxable mass of profits. It implies the reduction of the number of profitable enterprises in FE as the result of the economic situation deterioration and the introduction of a preferential tax regime in region's local areas.

Key words: territories of advanced development, free port of Vladivostok, Far East, development efficiency.

Introduction

Economic development of any macro-region is always accompanied by a significant regional polarization, which is the result of the territorial division of labor, and it is a stable form of differentiation of productive forces in time and space [1].

Theoretical justification for the inevitability of regional polarization was given in the middle of the 20th century by a French researcher F. Perroux, who departed from the principle of homogeneity (uniformity) of territorial development in his constructions [2, p. 123–138]. With the concept of "growth poles", he abstractly reviewed the economic space – as a certain force field of different intensity where centripetal forces, directed at certain centers (poles), and centrifugal forces, emerging from the latter, act [3]. This approach interprets "growth poles" as points of the concentration of economic, investment, and innovation activity that are formed around "propulsive" industries and capable of generating the economic growth on vast territories [4; 5], because new productions are more likely to provide agglomeration savings, benefits from the usage of common infrastructure and expansion of export-oriented markets [6]. At the same time, it is important to create a list and conditions for creating propulsive industries in a problematic region.

The most interesting results in the implementation of "growth poles" were obtained in France, where 69 growth poles, which are formed considering national, regional, and local interests in the process of defining its specialization, are currently identified [7; 8].

The successful experience of France has led to the worldwide usage of theoretical provisions of the "growth poles" concept in the elaboration of spatial development strategies. At the same time, unsuccessful examples of this idea's implementation are often ignored, although it is obvious that the concentration of productive forces at a specific point in space may contribute to the outflow of labor and material resources to a growth pole, exposing the lack of resources and entrepreneurial activity in peripheral areas. Moreover, as noted by M. Aglietta and R. Boyer, "it would be a mistake to try to import foreign models, even if they seem efficient: we are talking about creating original forms of the economic organization that would be adapted to the French (national – noted by us, S.L.) socio-economic context" (cit. from [9, p. 92–93]).

In the view of these provisions, the purpose of this study is to analyze the experience, accumulated in the Russian Far East (FE), of forming local zones with special economic conditions, identifying problems of its implementation, and assessing the impact of special legal regimes for stimulating entrepreneurship in local zones on the economy of the Far East.

The usage of methods for evaluating the efficiency of local zones and its impact on the state of the regional economy is currently complicated by unsolved theoretical problems

of evaluating the efficiency of regional policy instruments [10; 11]. Evaluation of the efficiency of the usage of state regional policy tools is performed only at the stage of justification of the need to use specific tools; monitoring of the implementation of projects and programs is conducted according to indicators of allocation and development of investment resources. However, it is not enough.

In the theory and practice of regional economics, there are, at least, four different approaches to assessing the efficiency of regional policy instruments: measurement of costs and benefits; comparison of actual results of using regional policy tools with possible development results without its usage; evaluation of certain indicators identified by the authors for an analysis; evaluation of the degree of goals' achievement. Each approach has its own strengths and weaknesses [12; 13; 14], but none of them is fully developed, and, therefore, none of them is generally accepted.

Two methodological approaches are used in this research:

– while evaluating the performance of local zones' functioning, attention is focused on assessing the degree of achievement of targets that are directly or indirectly declared as goals in the process of creating specific local zones ("growth points") in the Russian Far East;

– while evaluating the impact of local areas on the economy of FE, a comparative analysis of organizations' demography in FE entities and local zones was carried out; the change in the structure of incomes of consolidated budgets of Far Eastern regions and the quality of regional finances during the studied period were taken into account (2013–2019).

The Far East as the example of the growth points concept implementation

Throughout the history of economic development, the region has served as some kind of an economic laboratory, where, since Soviet times, attempts to create free economic zones as growth poles with special economic conditions have been made. In modern Russia, this experience was supplemented by controversial attempts to create several local zones with special economic conditions [15, p. 24–36]:

– free economic zones (FEZ) since 1990;

– special economic zones (SEZ) since 2005;

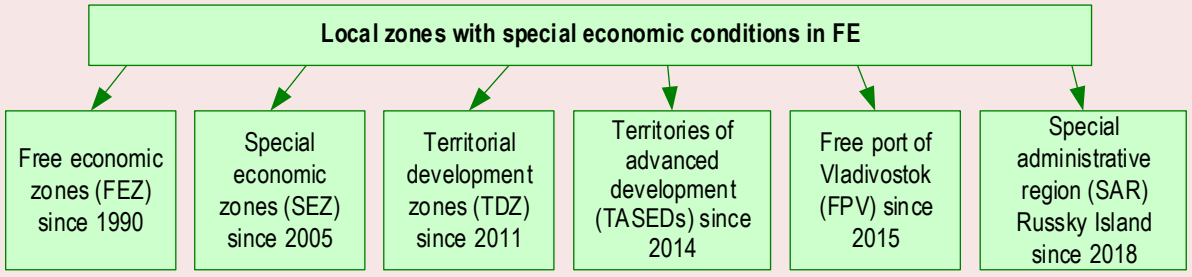
– territorial development zones (TDZ) since 2011;

– territories of advanced social and economic development (TASED) since 2014;

– free port of Vladivostok (FPV) since 2015;

– special administrative region (SAR) Russky Island since 2018 *(Fig. 1)*.

Figure 1. Types of zones with special economic conditions that have been implemented, or being implemented, in FE



We would like to note that attempts to implement the growth pole concept on Far Eastern soil in the form of free and special economic zones, as well as territorial development zones, were unsuccessful for a number of reasons:

• the territorial scale of the Soviet-era FEZ was huge; the status of FEZ was often assigned to entire Federal entities (FEZ "Eva" covered the entire territory of the Jewish Autonomous Oblast, and FEZ "Sakhalin" – the entire Sakhalin Oblast) which did not fit into dimensional requirements of the Perroux's growth pole model, and it was one of the reasons why the state could not provide required huge investments for territories' infrastructure preparation [16];

• while creating FEZs in Soviet Russia, the need to provide efficient regulatory and legislative support for the process of forming zones, proven by foreign experience, was not considered. Poorly developed legal framework of Soviet FEZs in terms of creating favorable tax, customs, and currency preferences for FEZ residents was worse than conditions in neighboring countries [17];

• while creating FEZ, the Russian government focused on the implementation of the fiscal function. It was aimed at quick replenishment of the budget's revenue share, which contradicted potential investors' interests and did not contribute to the growth of investment activity of zones' residents [18, p. 292–295];

• an attempt to revive the idea of growth poles under the guise of special economic zones, undertaken in 2009–2014, was thwarted by a protracted search for investors in formally created SEZs of the Far East, it was complicated by an ongoing crisis on the background of more significant benefits offered to investors on territories of advanced development, which, in total, led to the liquidation of all Far Eastern SEZs, which have not really begun to function, in 2016 [19];

• state support measures in territorial development zones (2011) were significantly lower than in special economic zones, or TASEDs, and it was not recorded in corresponding sub-legislative acts. Thus, despite the preparatory work in the Amur Oblast and Kamchatka, no TDZs were formed in the Far East [20].

Currently, in the Far East, three types of local zones, which correspond to the growth poles ideology, are implemented – territories of advanced social and economic development (TASEDs), free port of Vladivostok (FPV), and a special administrative region Russky Island (SAR Russky).

Problems of the formation and development prospects are different for each of types of Far Eastern local zones. Currently, the future of SAR Russky is uncertain.

Special administrative region (SAR) on Russky Island is the youngest tool of the spot impact among ones used in FE. Information about it is sparse and controversial. This special region was created in 2018[1], simultaneously with SAR on Oktyabrsky Island in Kaliningrad. In fact, these are two offshore zones of the Russian Federation formed to save Russian companies that were under sanctions of the United States [21]. JSC "Far East Development Corporation" (FEDC) was chosen as the management company of SAR, which would help applicants to find a place for registration in SAR and support their further work in Russia.

At the beginning of 2020, only two residents were registered in SAR Russky in Primorye (for comparison, there were 12 residents in the

[1] See Federal Law no. 291-FZ *"On Special Administrative Regions in the Territories of the Kaliningrad Region and Primorsky Krai"*, dated August 3, 2018.

Kaliningrad Oblast in SAR Oktyabrsky)[2]. The first company to register in the Russian "offshore" in Vladivostok was "Finvision Holdings", which previously was under Cyprus jurisdiction. The company is the main shareholder of "Vostochny Bank", one of the main banks in the Far Eastern Federal District. "Donalink" is a company that operates in the coal and energy business, it became the second resident of SAR Russky.

According to CEO of JSC "FEDC", investors of both companies preferred registering in Primorye because its main actives are centralized in the Far East[3]. Motherless, creation and functioning of SAR Russky has a political nature. It is no accident that the Ministry of Economic Development suggests not to disclose names of owners of companies from special administrative regions in the Unified Public Register of Legal Entities (UPRLE) for protection from sanctions[4]. The corresponding draft law is published on the federal portal of draft normative legal acts[5]. Although, according to available information, FEDC is in talks with three new companies about redomiciling, FEDC employees note: "It is impossible to miss a certain caution toward SAR from business"[6].

Considering everything mentioned above, it is difficult to talk about positive experience while implementing SAR Russky project and the significance of the impact of this local zone on the economy of the Far East. We can only refer to the opinion of the presidential plenipotentiary representative in the Russian Far East Yuri Trutnev that the regime of a special administrative region, introduced on Russky Island, did not give any advantages to the region[7].

Preferential regimes of Far Eastern local zones

Unlike SAR Russky, TASED and FPV projects are constantly discussed, in mass media too. However, before analyzing development features of TASEDs and FPV, it is necessary to understand similarities and differences of preferential regimes of residents' functioning in these territorial entities (*Tab. 1*).

FPV regime appeared a little later than TASED, but the main difference between these zone regimes, which is noted by the members of the Association of TASED and FPV residents, is an opportunity for FPV residents to get land for their projects without burdensome and expensive procedures. According to the results of a survey, conducted among residents of FPV in 2019, 86% of respondents said that the preference for land acquisition is a key for the implementation of their investment projects. If such a benefit was not available,

[2] Another company was registered in an offshore on the Russky Island. Available at: https://www.newsvl.ru/vlad/2019/03/15/178977/#ixzz6JLYLdpCZ

[3] In a special administrative region on Russky Island, international companies will receive additional benefits. Available at: https://erdc.ru/news/v-spetsialnom-administrativnom-rayone-na-o-russkiy-mezhdunarodnye-kompanii-poluchat-dopolnitelnye-lg/

[4] The Ministry of Economic Development suggests not to disclose names of owners of companies-residents of TASED and offshore on Russky Island for protection from sanctions. Available at: https://www.newsvl.ru/vlad/2019/10/11/184551/#ixzz6JLZhVExy

[5] On amendments to the Federal Law *"On limited liability companies"*, and certain legislative acts of the Russian Federation (in terms of accounting for rights to shares and maintaining a list of participants of the registrar public). Available at: https://regulation.gov.ru/projects#npa=95528

[6] The Ministry of Economic Development will increase the attractiveness of Russian offshores. Available at: https://primamedia.ru/news/896923/

[7] The "offshore zone" on the Russky Island did not bring anything to the region. Available at: https://www.newsvl.ru/vlad/2019/01/14/177130/#ixzz6JLaWnyNJ

Table 1. Features of TASED and FPV regimes

	TASED (2014)	FPV (2015)
Period	70 years with the possibility of extension	70 years with the possibility of extension
Infrastructure	Provided by a Management company (MC)	Independent connection
Land	Provided by MC	Received in a municipality without auction
Place of implementation	Defined by cadastral blocks for each TASED individually	Limited by municipalities' borders
Tax benefits for residents	- 7.6% social deductions in the first 10 years - 0% mineral extraction tax for the first 2 years, with a gradual increase of the reduction coefficient to 100% over 10 years - 0% income tax for the first 5 years, 12% for the next 5 years (2% - to the federal budget and 10% - to the regional budget) - 0% property tax for the first 5 years and 0.5% - in the next 5 years - 0% land tax (first 3-5 years)[8]	- 7.6% social deductions in the first 10 years - 10 days accelerated VAT refund - 5% income tax (0% - in the federal budget and not more than 5% to the regional budget) - 0% land tax for 5 years - 0% property tax for the first 5 years and 0.5% - in the next 5 years
Required investments	500 thousand rubles	5 million rubles over three years
Special obligations of a resident	Responsible for failure to use requested infrastructure	None

According to: *"On the free port of Vladivostok":* the Russian Federation Law no. 212-FZ, dated July 13, 2015. Information and legal base "Konsul'tantPlus". Available at: http://www.consultant.ru/document/cons_doc_LAW_182596/; *"On the Territories of Advanced Social and Economic Development in the Russian Federation"*: the Russian Federation Law no. 473-FZ, dated December 29, 2014. Information and legal base "Konsul'tantPlus". Available at: http://www.consultant.ru/document/cons_doc_LAW_172962/ (accessed April 2, 2020).

more than 40% of respondents would refuse to implement projects because of the long registration of land plots, and more than a third of respondents would do the same because of the high cost of land plots formed at auction[9].

Dynamics of the number of zone residents

TASED project has been underway in FE since December 2014, and it has the most advanced economic, regulatory, and organizational history among local preferential regimes in the Far East. To date, the experience of Far Eastern TASEDs is replicated in 154 Russian municipalities [22], where territories of advanced socio-economic development, positioned as potential growth poles, have been created.

At the beginning of April 2020, there were 465 active residents in 20 TASEDs (*Fig. 2*).

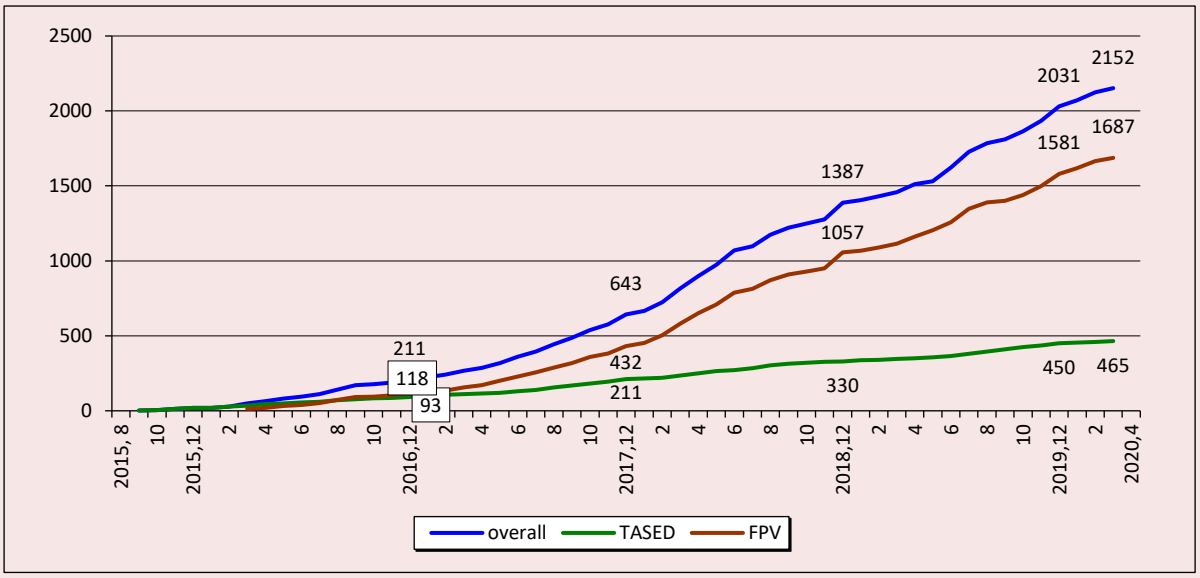
The idea of FPV creation emerged as the continuation of TASED idea, and it acquired legislative features extremely fast. It could be explained by the intention to introduce potential investors to this project at the 2015 Eastern Economic Forum (Vladivostok). To implement this idea, on December 4, 2014, in the Address to the Federal Assembly, V. Putin suggested granting Vladivostok the status of a free port. In March 2015, the draft of a federal law was ready; it was adopted in June, and, in October 2015, Federal Law no. 212 "On the free port of Vladivostok"[10] came into force. The first residents of this FPV were registered in March 2016.

[8] Exact term is set by a representative body of the municipality.

[9] The Association of residents defended the key preference of the free port of Vladivostok. Available at: https://primamedia.ru/news/927383/

[10] *"On the free port of Vladivostok"*: the Russian Federation Law no. 212-FZ, dated July 13, 2015 // Information and legal base "Konsul'tantPlus". Available at : http://www.consultant.ru/document/cons_doc_LAW_182596/ (accessed April 2, 2020).

Figure 2. Monthly dynamics of the number of TASEDs and FPV residents, 2015–2020, units



According to: *"Register of residents of territories of advanced socio-economic development"*. Available at: https://erdc.ru/upload/reestr-tor.pdf; *"Register of residents of the Free port of Vladivostok"*. Available at: https://erdc.ru/upload/reestr-spv.pdf (accessed April 2, 2020).

As of April 1, 2020, the FPV project had 1.687 residents (see: Fig. 2).

As it could be seen in the presented data, FPV was formed later than TASEDs, but it had more residents in August 2016. Although quantitative analysis of practical results of FPV and TASED projects in the region is hindered by a relatively short term of the existence of special legal regimes and the absence of sufficient empirical information on the performance of zones' residents, let us review the features of creation and functioning of TASEDs and FPV in FE.

Features of creation and functioning of TASEDs in FE

The first three territories of advanced development were created in FE in June 2015 (Khabarovskaya and Komsomolskaya in the Khabarovsk Krai, Nadezhdinskaya – in the Primorsky Krai)[11]. In the period from August 2015 to August 2018, 15 more TASEDs were formed in 8 Far Eastern regions of the Federation. In 2019, two territories of advanced development were created in regions newly affiliated with the Far Eastern Federal district – "Buryatia" and "Transbaikal".

As of April 1, 2020, there were 20 TASEDs operating in the Far East, the total number of active residents was 465, with a total enterprise mortality rate of 9.5% for 2015–2020 (*Tab. 2*).

As it could be seen in the table, the first created TASEDs might be described as "complex" since the total number of activities, which have a special legal regime for conducting business in these zones, was 50–53. Since 2016,

[11] *"On the Territories of Advanced Social and Economic Development in the Russian Federation"*: the Russian Federation Law no. 473-FZ, dated December 29, 2014. Information and legal base "Konsul'tantPlus". Available at: http://www.consultant.ru/document/cons_doc_LAW_172962/ (accessed April 2, 2020).

Table 2. Structure of Far Eastern TASEDs (as of April 1, 2020)

Region	TASED's name	Date of creation (m.y)	Specialization	Number of priority activities*	Number of registered residents since the formation	Number of terminated agreements since the formation	Number of active residents
Primorsky Krai	Nadezhdinskaya	06.15	Industrial and logistics, food, agriculture	53	80	12	68
	Mihaylovskaya	08.15	Agricultural industry	53	19	1	18
	Bol'shoy Kamen'	01.16	Shipbuilding, tourism	51	25	4	21
	Neftehimicheskaya	03.17	Oil processing	33	2	-	2
Khabarovsk Krai	Komsomol'sk	06.15	Industrial, production of components for the aircraft industry	53	37	7	30
	Khabarovsk	06.15	Industrial and logistics, agriculture, metallurgical production	53	52	11	41
	Nikolaevsk	04.17	Ship repair, processing of water biological resources, extraction of minerals	7	7	-	7
Jewish Autonomous Oblast	Amuro-Khinganskaja	08.16	Mining, tourism, light, and food industries	13	6	1	5
Amur Oblast	Belogorsk	08.15	Agriculture, food production	53	10	1	9
	Priamurskaya	08.15	Industrial and logistics	55	10	1	9
	Svobodnyy	06.17	Gas processing plant, petrochemical industry	20	8	-	8
Sakhalin Oblast	Gornyy vozduh	03.16	Tourism	16	27	-	27
	Juzhnaya	03.16	Agriculture, food production, tourism	23	10	1	9
	Kurily	08.17	Fishing industry, mariculture, tourism	6	4	-	4
Kamchatka Krai	Kamchatka	08.15	Tourism, industrial and logistics, agriculture, fishing and fish farming	50	104	5	99
Republic of Sakha (Yakutia)	Kangalassy (industrial park)	08.15	Industrial (production of chemical, plastic and rubber products), crop production and animal husbandry	51	26	4	22
	Southern Yakutia	12.16	Mining, coking coal mining and processing	33	18	-	18
Chukotka Autonomous Okrug	Chukotka	08.15	Mining, fishing	47	55	1	54
Republic of Buryatia	Buryatia	06.19	Crop production, animal husbandry, construction of engineering structures	6	2	-	2
Zabaykalsky Krai	Transbaikal	07.19	Crop production, animal husbandry, forestry and logging, mining of coal and metal ores, production of food products, coke, oil, and chemical products, construction, water, air and space transport	24	12	-	12
Total	**20**			**700**	**514**	**49**	**465**

***** Types of economic activities subjected to a special legal regime of entrepreneurial activity on the territory of advanced socio-economic development.
According to: "*Register of residents of territories of advanced socio-economic development*". Available at: https://erdc.ru/upload/reestr-tor.pdf (accessed April 2, 2020).

the federal government has changed the policy of creating TASEDs with focusing on "narrow-profile" zones, where the number of permitted activities ranges from 5 to 24.

Investors' activity greatly varies in different zones. At the beginning of April 2020, TASED "Kamchatka" was the largest among all zones according to the number of active residents (99). It is followed by "Nadezhdinskaya" (68), "Chukotka" (54), "Khabarovsk" (41), and "Komsomol'sk" (30). Among TASEDs with the smallest number of residents, as of April 1, 2020 – "Neftehimicheskaya" (2) and "Kurily" (4) lead. Among newly created TASEDs, "Buryatia" stands out: it had only two residents at the time of the study.

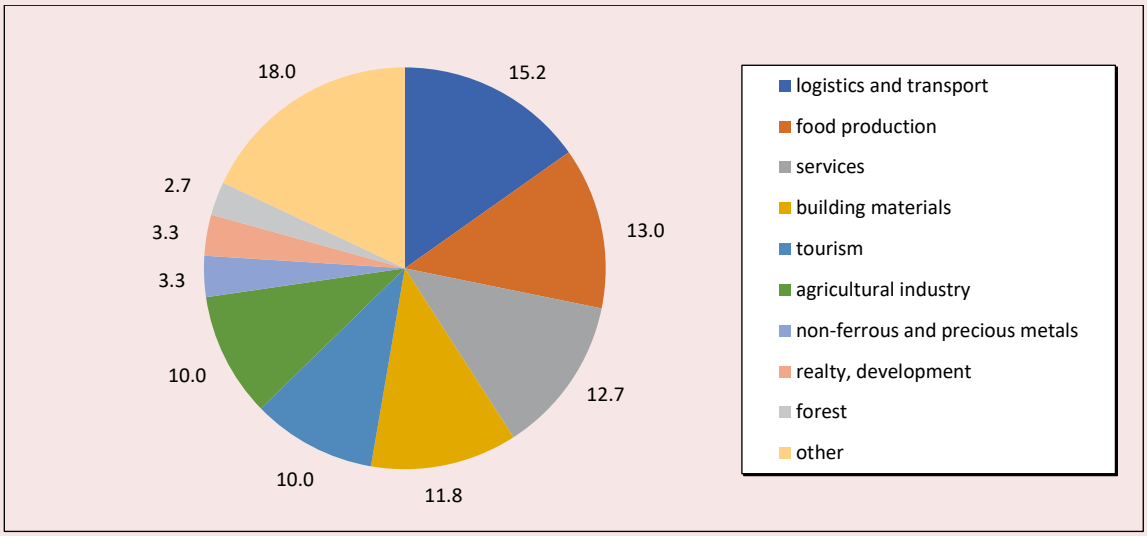
It could be assumed that the significant discrepancy between TASEDs according to the number of residents might be explained by several factors [23]. TASEDs, which are leaders in terms of the number of residents, were opened in 2015 and, as the result, they have a longer history than ones created later. "Complex TASEDs" are objectively opened to more entrepreneurs, and they are more attractive. It is no accident that 5 largest TASEDs are "complex". On the other hand, we may hypothesize that the size of large TASEDs ("Nadezhdinskaya", "Khabarovsk", and "Komsomol'sk") is positively affected by proximity to large cities ("Nadezhdinskaya" is in Vladivostok's suburbs). However, this assumption is disputed by the "Kamchatka" TASED: it is the leader according to the number of residents among all territories of advanced development in the Far East.

TASEDs' specialization

Main areas of specialization and the number of economic activities, which could be conducted in each TASED, are shown in *table 2*. Since one resident can carry out several types of economic activity, total number of registered types of economic activity (700) is 1.5 times higher than the number of operating residents (465), as of April 1, 2020.

On the basis of registers, maintained by "Far East Development Corporation", which contain data on residents' economic activities, we will evaluate the sectoral structure of residents of Far Eastern TASEDs (*Fig. 3*).

Figure 3. Sectoral structure of TASEDs' residents, according to data as of January 1, 2019, % from total number



Calculated according to: "Register of residents of territories of advanced socio-economic development". Available at: https://erdc.ru/upload/reestr-tor.pdf

As it could be seen in the figure, the sectoral structure of territories of advanced development includes more than a half of enterprises from four groups of industries: logistics and transport (15.2%), food production (13%), services (12.7%), and building materials (11.8%).

Gas, petrochemical, and shipbuilding companies form only 0.6; 0.6; and 1.2% of the number of enterprises, respectively. However, according to declared investment amounts (949, 784, and 200 billion rubles, respectively), it will have formed 83% of the investment portfolio of Far Eastern TASEDs by 2029.

In practice, residents of TASEDs have a relatively low mortality rate – 9.5%, and, given that 75% of enterprises in Far Eastern TASEDs are small and medium-sized, it could be considered an indicator of a generally favorable microclimate for residents.

However, the issue of the efficiency of the impact of TASEDs' preferential regimes on recipient regions requires independent consideration. Currently, benefits are mainly related to taxes and a number of material benefits for businesses on a significant number of sites in TASEDs (see: Tab. 1), which often leads not to a competition between residents for an opportunity to be on a particular site but to a struggle of preferential regimes for residents. It is no accident that the deputy minister of economic development noted at the 5th Eastern Economic Forum in 2019 that "benefits in TASEDs become even more extensive, regions offer conditions that do not always have a positive impact on the economy of a region itself"[12].

Due to its importance, the issue of assessing the impact of preferential regimes of local zones on the economy of the Far East requires more detailed consideration. After analyzing features of the creation and functioning of FPV as another type of local zones in FE, we would like to return to the issue of assessing the impact of local zones' regimes on the economy of the macro-region.

Features of creation and functioning of FPV in FE

First residents of free port of Vladivostok were registered in March 2016. Currently, the project is implemented in 22 municipalities of five Far Eastern entities of the Russian Federation (*Tab. 3*). Total number of FPV residents increases quite dynamically. At the beginning of 2019, FPV had 1057 residents, and this number increased to 1687 quite fast. Overall mortality rate of enterprises in this FPV is lower than in TASEDs, and it was 4.1% during the project implementation period.

As it could be seen in data, given in the table, the territorial core of FPV is made up of residents of the Primorsky territory. This is where 85% of the total number of residents are located, and 82% of investments, out of declared 582 billion rubles, is expected to be spent by 2029. Primorye will also account for 92% of new jobs, out of 60 thousand, that are planned to be created in FPV.

Current high concentration of zone's residents in Vladivostok, which has more than 600 thousand people, with an established building, set town-planning zoning, with a limited number of free land plots in state, or municipal, ownership, and simultaneous high demand for these lands has led to the fact that the key benefit of this type of local areas (land without auction) becomes a significant problem in implementing FPV mode. There is a competition between FPV residents claiming the same land. As the result, in Vladivostok city district, at the beginning of April 2020, more

[12] They lowered it but did not raise it. The deputy head of the Ministry of economic development went through preferential regimes. Available at: https://konkurent.ru/article/24200

Table 3. Territorial structure of FPV residents

Federation entity	Territorial distribution of FPV residents	Number of residents, un.	Investments, billion rubles		Jobs, un.	
		As of January 1, 2019	Plan (2029)	Fact (January 1, 2019)	Plan (2029)	Fact (January 1, 2019)
Kamchatka Krai	CD* Petropavlovsk-Kamchatsky	116	7	1	1668	135
Chukotka AO	CD Pevek	5	0	0	24	0
Sakhalin Oblast	Uglegorskiy MR**; CD Korsakovskiy	26	12	0	1046	155
Khabarovsk Krai	Vaninskiy MR and Sovetsko-Gavanskiy MR	15	82	14	2102	156
Primorsky Krai	16 adm. regions: CD Artem, CD Vladivostok, CD Bol'shoy Kamen', CD Nahodkinskiy, CD Partizanskiy, CD Spassk-Dal'niy, CD Ussurijskiy, Nadezhinskiy MR, Shkotovskiy MR, Oktyabr'skiy MR, Ol'ginskiy MR, Partizanskiy MR, Pogranichnyy MR, Hasanskiy MR, Lazovskiy MR, Hankajskiy MR	895	478	38	55189	6144
Total		**1057**	**582**	**54**	**60029**	**6590**

* CD – city district, ** MR – municipal region.
According to: *The results of 2018: report*. Far East Development Corporation. Moscow, 2019. 153 p.

than 70% of FPV residents, who applied for land plots, did not receive it[13].

Given the high demand for land plots on FPV territory, a draft of a Federal Law was submitted to the State Duma of the Russian Federation on March 24, 2020, in which the problem of a competition between FPV residents, claiming the same land plot, is proposed to be solved by returning to auction procedure[14].

It is quite difficult to assess consequences of such law. It was noted above that, in 2019, during the survey, 86% of FPV residents, in order to address the issue of placing production in FPV, spoke out about defining importance of preferences in obtaining land plots. In such circumstances, the adoption of the proposed draft of a Federal Law by the State Duma may dramatically affect the number and industry structure of FPV residents.

FPV specialization

The sectoral structure of residents in the free port of Vladivostok that is currently being formed, according to the information from the register of FPV residents, maintained by FEDC, is shown in *Figure 4*.

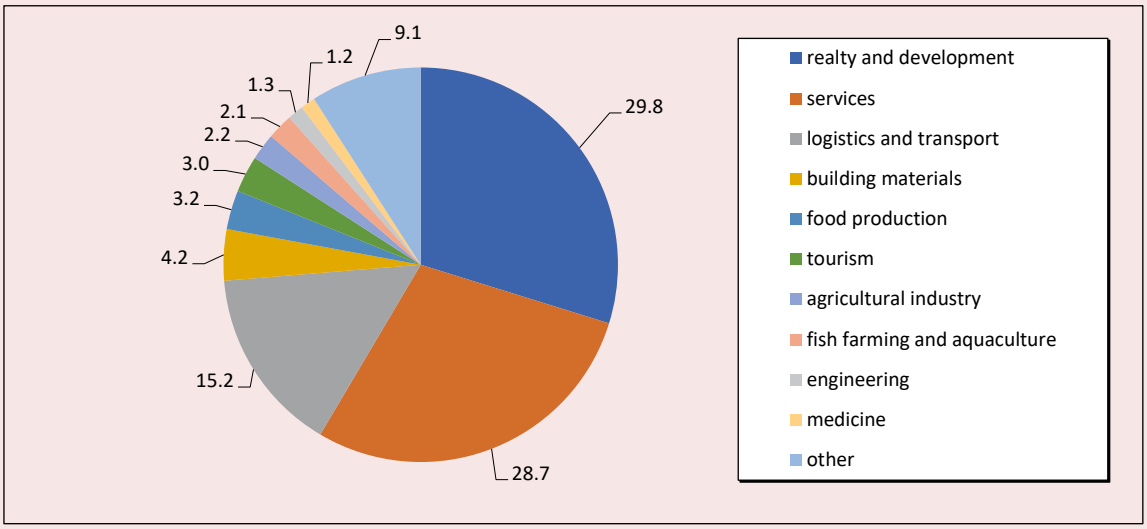
The fact that, in the sectoral structure of FPV residents, group of transport and logistics companies takes only the third place (15.2%), out of total number of FPV enterprises, is somewhat unexpected. It is significantly lower than the largest group of businesses related to realty and development (29.8%) and sphere of services (28.7 %).

The analysis of potential investments' structure, declared for development by residents of the zone, changes the situation with leading sectors in FPV. Out of 582 billion rubles of potential investments, announced

[13] The Association of residents defended the key preference of the free port of Vladivostok. Available at: https://primamedia.ru/news/927383/

[14] Draft of the Federal Law no. 928822-7 *"On recognizing certain provisions of legislative acts of the Russian Federation in relation to changes in the procedure for leasing land plots in state or municipal ownership to residents of the free port of Vladivostok as invalid"*. Available at: https://sozd.duma.gov.ru/bill/928822-7#bh_note

Figure 4. Sectoral structure of FPV residents, as of January 1, 2019, % out of total number of enterprises



According to: *"Register of residents of the Free port of Vladivostok"*. Available at: https://erdc.ru/upload/reestr-spv.pdf (accessed April 2, 2020).

for development until 2029, 42.2% will be invested in logistics and transport enterprises, 33.4% will be in realty and development, 6% will be in the service sector, 3.8% will go in fish farming and aquaculture, 2.1% will be in tourism, 1.2–1.4% of investments will be in building materials, food production, and forest. The contribution of other industries to the potential investment portfolio of FPV is less than 1% [24].

An interesting fact is the high share of small and medium-sized enterprises (SMEs) among residents of local zones. Thus, 92% of the number of FPV residents are SMEs, which is 17 p.p. higher than the share of SMEs among TASED residents. Moreover, among SMEs, registered in the free port of Vladivostok, more than 97% are micro-enterprises. Such a high percentage of SMEs is neither good nor bad. The subordination of small enterprises and enterprises-leaders of propulsive industries in terms of the formation of the induced system effect is important. This issue requires separate consideration, and it is only postulated here, due to the current absence of data on the economic activity of SMEs in local areas of the Far East.

In summary, we would like to note that the business climate, which emerges within local zones of TASEDs and FPV, is generally positive for its residents, but it has not yet settled (the latter is evidenced by attempts to revise provisions on the declarative principle of land allotment to FPV residents or the competition of TASEDs preferential regimes in the struggle for residents).

Assessment of the impact of local zones on FE economy

Such analysis is complicated by the absence of comprehensive assessment of zones' performance from the point of view of all parties concerned. Infographics of the Ministry of Development of the Far East and Arctic and FEDC reports consider this issue only from the standpoint of the efficiency of using budgetary funds, but it does not analyze the achievement

of declared goals of creating local zones in FE, the impact of these areas on the region's business climate, and the quality of regional finance.

To assess the impact of preferential regimes of local zones on the economy of FE, it is necessary to answer, at least, three questions. First, do Far Eastern models of TASEDs and FPV formation correspond to provisions of F. Perroux's classical model of growth poles and, as the result, do anchor companies, which form in zones, have a propulsive nature to form local zones of international level in the region?

Second, how do preferential conditions for zone's residents stimulate development of business environment in Far Eastern regions of the Russian Federation, and do such conditions pose a competition for non-residents of zones?

Third, how did the creation of Far Eastern TASEDs and FPV affect the quality of regional finance and the structure of the revenue base of regional budgets?

The answer to the first question is important, because, according to F. Perroux, it is propulsive industries that determine the nature of the emerging growth pole[15]. As global experience shows, in successful cases of implementing ideas of the "growth poles" theory, the correct choice of propulsive industries, or its combinations, had a key importance [6; 7; 9].

In this regard, we would like to note that transport and logistics, which occupy a significant share among enterprises-residents among Far Eastern local zones, are infrastructural sectors. Its propulsive effect is small and rather induced, when, for example, capacities for product refinement are created on port territories, etc. [25; 26; 27].

In addition, the analysis of the specialization of created TASEDs and FPV shows that most projects are designed for local Far Eastern market or the organization of import substitution. Forming specialization of Far Eastern local zones, supported by statements of federal authorities' representatives that "the Far East needs all investors"[16], causes doubt that the Russian Government will be able to implement main idea of creating local zones in the region – to form an industrial cluster in FE which will be able to integrate in the international industrial network of countries in the Asia-Pacific region.

Problems in achieving postulated goals of creating local zones are also indicated by the emerging mechanism for managing its activities. Thus, in Russia, the organization of regional management of advanced development territories is based on the idea of a functional approach, starting with the organization of infrastructure creation, aim at the production of finished products within the zone, and ending with criteria for the success of TASED activities (the number of jobs created, the volume of attracted investments [24]). It does not take into account the proximity of Far Eastern TASEDs to dynamically developing countries of the Asia-Pacific region, which are characterized not by a functional but organizational structure of production management, in which responsibility for the output of the final product is distributed among several countries (regions). For example, the share of intra-industry trade between the Republic of Korea and the PRC has grown significantly in the past decade, especially with industrial

[15] In the model of "growth poles" formation, F. Perroux classified production sectors according to development trends into three groups: degrading, with a tendency to reduce its share in the structure of the region's economy; with a high growth rate but not significantly affecting development of other sectors of the territory; propulsive industries, which are characterized by the significant increase of production, and the generation of a chain reaction of growth of industrial centers, stimulating industrial development of the region [2, p. 123-138].

[16] Deputy minister: "FE needs all possible investors". News@mail.ru, March 1, 2017.

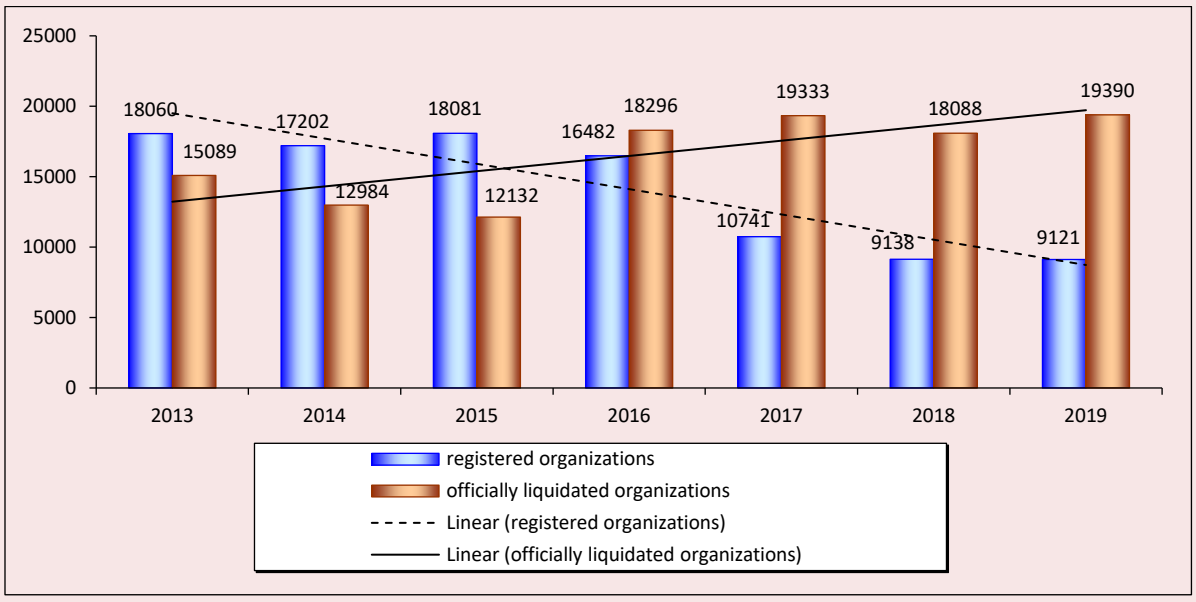
goods and intermediate products [28]. It confirms advantages of a process approach to organizing production, especially in conditions of high competition and frequent changes in business processes. Therefore, objectively emerging focus of Far Eastern TASEDs, as well as FPV residents, on domestic demand and import substitution may hesitate its export specialization.

Highly likely that, for Far Eastern TASEDs and FPV, it may mean a repeat of the situation recorded by experts in special economic zones. Thus, during inspections of the accounting chamber, it turned out that, in 2013–2018, 80% of the value of exported SEZ products was intended not for export but for sale on the domestic market of the Russian Federation [29]. At the same time, the assessment of the availability of similar production facilities in the Russian Federation showed a significant number of enterprises with similar production characteristics that operate normally, without applying the benefits provided within SEZ. In other words, the export of goods from SEZ territories, moved by SEZ residents within the framework of free customs zone procedures, did not have an export orientation during the studied period. That is, most firms sought to be located in special economic zones only to obtain tax preferences in comparison with other "non-regional" enterprises that produce similar products.

To answer the second question – how preferential conditions for zones' residents stimulate development of the business environment in FE, let us analyze the demographics of organizations in the Far Eastern Federal Okrug (FEFO).

Comparative analysis shows that, for 2015–2019 period (the period since the beginning of the functioning of local zones in FE), on the background of increasing number of residents in TASEDs and FPV (see: Fig. 2), general economic situation for enterprises in the macro-region as a whole has become extremely unfavorable (*Fig. 5*).

Figure 5. Number of registered and officially liquidated organizations on the territory of FEFO, 2013–2019, un.



According to: data of Federal State Statistics Service. Available at: www.gks.ru/ (accessed April 7, 2020).

If in 2013–2015, while analyzing demographic indicators of FEFO enterprises, it was possible to talk about their expanded reproduction, when one liquidated enterprise accounted for 1.2; 1.32, and 1.49 newly created enterprises, respectively; from 2016 to 2019, the opposite trend was observed – in the Far East, the number of liquidated enterprises exceeded the number of newly created ones. This gap increases. Since 2016, the general situation has begun to resemble the "Russian cross", well-known for its demography.

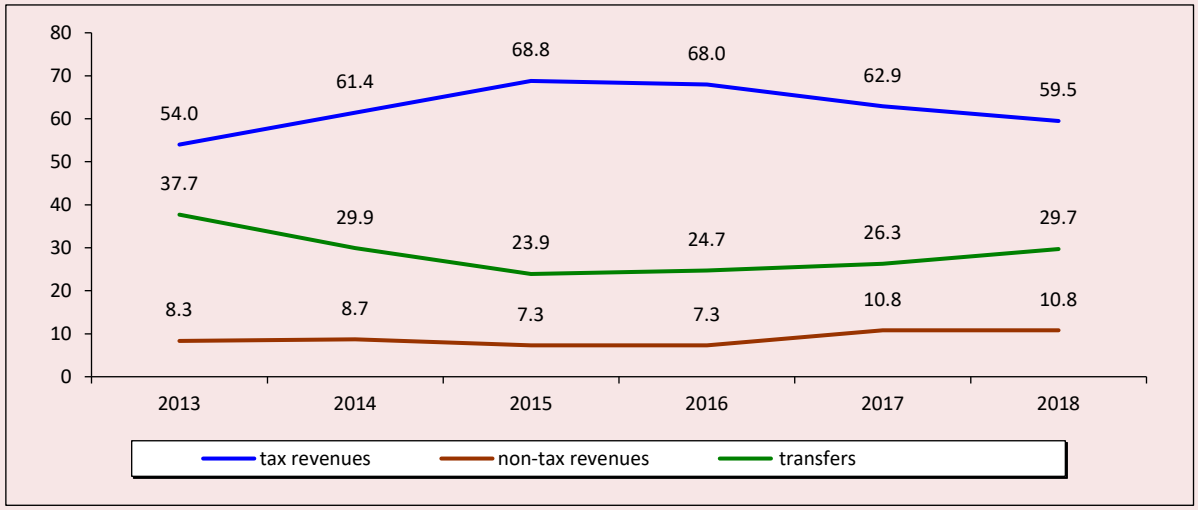
On the background of growing number and low mortality of resident-enterprises in TASEDs and FPV, the demographic situation with Far Eastern enterprises may be interpreted as the emergence of some kind of a "vacuum cleaner" that sucks resources from problem regions to potential growth poles (TASEDs and FPV). Existing empirical studies confirm this fact [11; 23].

The third group of questions to be answered within the assessment of the impact on the economy of the macro-region of TASEDs and FPV concerns the impact of local zones on the structure of the revenue base of regional budgets and changes in the quality of regional finances.

During the analyzed period (2013–2018), most noticeable changes occurred in the structure of revenues of consolidated budgets of Far Eastern regions of the Federation. Main sources of revenue for budgets of Far Eastern regions are traditionally tax and non-tax revenues, as well as transfers from other budgets (*Fig. 6*).

As it could be seen in the figure, the improvement in the structure of the consolidated budget of Far Eastern regions of the Russian Federation in 2014–2015 at the expense of the increase of the share of tax revenues was short-term, and it was not related to activities of local zones. On the contrary, during the period of local zones functioning (2015–2018), the structure of the consolidated budget of Far Eastern regions of the Russian Federation began to deteriorate, which is associated with the decrease of the share of tax revenues in budget revenues and the increase

Figure 6. Revenue structure of consolidated budgets of Far Eastern entities of the Russian Federation, %



According to: Information on the execution of the consolidated budget of the entity of the Russian Federation and the budget of the territorial state extra budgetary fund. Available at: https://roskazna.ru/ispolnenie-byudzhetov/konsolidirovannye-byudzhety-subektov/ (accessed: February 4, 2020).

Table 4. Volume and structure of main tax revenues of consolidated budgets of Far Eastern regions of the Russian Federation in 2013–2018, bill. rub./%

	2013	2014	2015	2016	2017	2018
Tax revenues	*349.0/100*	*432.6/100*	*544.9/100*	*526.5/100*	*488.2/100*	*540.2/100*
Income tax	97.2/27.9	159.3/36.8	240.3/44.1	196.7/37.4	143.7/29.4	159.4/29.5
Personal profit tax	149.0/42.70	158.1/36.5	163.5/30.0	178.1/33.8	187.3/38.4	210.5/39.0

According to: Information on the execution of the consolidated budget of the RF entity and the budget of the territorial state extra budgetary fund. Available at: https://roskazna.ru/ispolnenie-byudzhetov/konsolidirovannye-byudzhety-subektov/ (accessed: February 4, 2020).

of non-tax revenues and transfers. It could be assumed that this situation was influenced by changes in the qualitative structure of main tax revenues of the consolidated budget of Far Eastern federal entities (*Tab. 4*).

Data, presented in the table, show that, in the studied period, the share of profit tax in main tax incomes of Far Eastern entities of the Russian Federation significantly (by 14.1 p. p.) exceeded the share of personal income tax only in 2015. The worsening of the economic situation in 2016–2018 led to the decrease of the share of profit tax from 44.1% in 2015 to 29.5% in 2018 with simultaneous growth of the share of income tax in main tax profits of regional budgets from 30 to 39% for the same amount of time.

This situation could be interpreted as the reduction of the total number of profitable enterprises in the region as the result of a certain deterioration of the economic situation in the Far East and the introduction of a preferential tax regime in local zones, which also reduced the total taxable mass of profits.

Conclusions

1. Activity of residents' registration in local zones, low mortality rate of enterprises created in zones, and declared mood of zones' residents to increase investment activity and create new jobs are regarded by federal authorities and their affiliated organizations as positive signals to stimulate business in the Far East.

2. Business climate, emerging within local zones, is generally positive for its residents, but it has not yet been established (as evidenced by attempts to revise provisions on the declarative principle of land allotment to FPV residents or the competition of preferential TASEDs regimes in the struggle for residents).

3. TASEDs and FPV, created in the Far East, do not fully meet the definition of F. Perroux on local points ("poles") of growth. There are no clearly defined propulsive industries, and a significant number (75–92%) of residents belong to the type of small and medium-sized enterprises, and they are poorly connected with enterprises-leaders of zones. The state is not concerned with the formation of propulsive industries in growth poles: it focuses on overall growth of attracting any investment to zones.

4. Objectively formed within the sanctions war, the specialization focus of Far Eastern local zones on domestic demand and import substitution may hesitate its export specialization, block endogenous economic growth in areas of local growth points, created in the Far East, giving it features of growth poles of, at best, local meaning, according to the terminology of F. Perroux.

5. Preferential climate that is being formed in local zones does not have a clear positive impact on the business climate of Far Eastern federal entities. With growing number of residents in local areas with favorable economic conditions, the demography of the number of established and liquidated enterprises in the Far East in recent years has been similar to

the "Russian cross" (the number of liquidated enterprises exceeds the number of newly created ones).

6. The analysis of the status of consolidated budgets of Far Eastern entities of the Federation with the goal of seizing the impact of the special regime of entrepreneurial activities in special zones on the economy of the Far East has shown that the improvement of the structure of the consolidated budget of Far Eastern entities of the Russian Federation, due to the increase of the share of tax revenues, which emerged in 2014–2015, have been short-term. Radical improvement of the structure of the consolidated budget of constituent entities of FEFO in the studied period (2013–2018) has not occurred.

7. The quality of regional finances in Far Eastern entities of the Federation has deteriorated. When the share of profit tax in regional budgets begins to decrease, the share of personal income tax starts to grow. This situation could be interpreted as the reduction of total number of profitable enterprises in the region as the result of the deterioration of the economic situation and the introduction of preferential tax treatment in local zones, which also reduced the total taxable mass of profits.

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Regional Specialization and Agglomeration Effects in the Russian Economy

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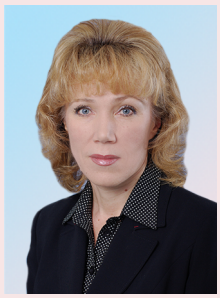

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Abstract. The main goal of economic science which is the search for ways to meet the existing needs by means of limited resources is of particular relevance today in the context of the Covid-19 pandemic, the rapid recession of the world economy, reduced export volumes and energy prices decline. Agglomeration effects represent savings of the region's assets from their more efficient distribution based on specialization. The purpose of the research is to develop theoretical and methodological aspects of specialization and agglomeration effects, which determined the need to solve the following tasks: (1) to provide an overview of approaches related to the study issues, (2) to assess the regional specialization of Russia and calculate agglomeration effects in agriculture, mining and processing sectors of industry, and the service sector, (3) to build a model of agglomeration effects impact on the regions' economic development. The article presents the systematization of research on agglomeration processes through the allocation of groups of works that are based on the classification of Duranton and Puga, territorial and geographical

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approaches, the study of related diversity, the use of the cross-sectional analysis results, sorting processes, and agglomeration economy analysis. The economic point of evaluating a region's specialization is to identify the industries in which it has competitive advantages in order to attract targeted resources. The assessment of agglomeration effects in Russia has shown that not all regions fully realize the advantages of specialization. The constructed models allowed to determine that (1) labor remains the key factor of development in agricultural and industrial regions; (2) roads are not a significant infrastructure indicator of development; (3) agglomeration effects in agriculture and services do not provide the desired result of the per capita GRP increment; (4) the manufacturing sector development is still an important condition. The article proposes a model allowing the assessment of the impact of agglomeration factors and regional specialization, the results of which can become an information basis for the development of regulatory actions in regional management. The research can be valuable for both the researchers and decision-makers in the field of spatial development.

Key words: regional specialization, agglomeration effects, regional economy, new economic geography, economy of localization, regions of Russia.

Introduction

New challenges emerging in the economy today – the spread of the Covid-19 pandemic, a sharp and significant decline in energy prices – threaten the countries' and regions' development stability. Russia is already experiencing and predicting an economic downturn, rising unemployment, the closing of small businesses, and a crisis in a number of industries. In the current circumstances, any actions in the sphere of regional economic policy should be carefully thought through and scientifically justified.

Agglomeration effects are the region's invisible resources allowing additional competitive advantages based on the existing specialization to be obtained. Their study and development analysis allow economic policy to be more targeted, since improving the quality of management decisions at the regional level is impossible without a deep analysis of the resources available in the region, their sources and directions of use [1]. For example, in an earlier study [2], it was shown that narrow specialization in industry is combined with a high level of socio-economic development in those regions that are engaged in mining. For other constituent entities of the Federation, specialization in a particular sector does not bring economic benefits.

The purpose of the research is to develop theoretical and methodological aspects of specialization and agglomeration effects with testing of the proposed approach to their assessment in the regions of Russia and modeling the impact of agglomeration processes on the per capita GRP level, which will help to identify additional reserves of socio-economic development and can be used in the development and implementation of regional economic policy.

The scientific novelty of the research consists in the systematization of works on the study of agglomeration processes in economic science, the proposal of an approach to determining the full use of the advantages of regional specialization to achieve agglomeration effects, modeling the impact of agglomeration effects on the regions' socio-economic development.

The work will be structured as follows. In the first part, we present theoretical studies of regional specialization and agglomeration

effects. In the second section, we analyze the level and character of specialization in Russian regions and determine the resulting agglomeration effects. The research methodology and model specification are presented in the third part of the article, and the analysis of the results is presented in the fourth part. In conclusion, the main recommendations are presented.

1. Theoretical studies of regional specialization and agglomeration effects.

The processes of globalization taking place in the world require a high level of competitiveness from the Russian economy, which largely depend on the external and internal efficiency of regional development [3], their specialization and the ability to use the emerging agglomeration effects. Research in this area is currently one of the most relevant areas in location theories. A bibliometric analysis of research has shown that the number of publications on the keyword *"Location theory"* from 1991 to 2018 grew exponentially by 10% per year. Since 2004, an average of 172 papers have been published annually.

In modern economic science, research on agglomeration processes has become an independent field. Let us pay attention to several approaches in this area.

The first is presented by the studies based on ***the classification of Duranton and Puga*** which can be divided into a separate group; this research distinguishes external savings from (a) sharing resources, suppliers, specialized infrastructure, and institutions (*sharing)*; (b) greater opportunities for selecting the best employees, suppliers, intermediaries, partners and investors due to their concentration on a given territory (*matching*); (c) ease of learning new technologies, management methods, faster progress along the experience curve (*learning*) [4]. This approach has some disadvantages and needs to be developed [5], but it has become the basis for many successful studies.

The second is ***territorial approach*** to the economy of agglomerations, in which the static analysis proves that a high level of efficiency is the determining factor of urban growth, while the dynamic analysis considers this relationship depending on the size of the city. It is shown that in each size class, the agglomeration economy has its own impact on the growth of the city [6].

The third is ***geographical approach*** explaining agglomeration processes through the growth of small cities located near the large ones – the spread of agglomeration effects [6, 7].

The fourth is the study of agglomeration processes through the definition of the industries cognitive proximity, which occurs together with the transfer of knowledge, attitu-des, and ideas between the partners of various organizations [8] with the concentration of economic activity on the territory. ***Related diversity*** occurs between sectors that tend to complement and share skills (contributing to the study of Jacobs externalities). Unrelated diversity leads to the formation of a "portfolio effect" – a diversified economy that can withstand external negative impacts and risks [9, 10].

Fifth, modern research using ***cross-sectional analysis***, which was initiated by Ciccone and Hall. They showed that doubling the number of people employed in the economy will lead to a 6% increase in its productivity [11]. Considerable attention in this group of works is paid to the study of cause-and-effect relationships. For example, if we can predict that increasing population density will increase productivity, it is logical to assume the opposite – regions with high productivity attract more skilled workers.

Sixth, this is research based on ***sorting processes***. Thus, Combes and his co-authors showed that employees' individual skills play an important role in explaining wage inequality

between cities (regions), the proof of which was based on skill sorting [12].

Seventh, analysis of ***the economy of heterogeneous agglomeration processes***.

One of the current tasks today is ***to determine the conditions and effects of locating economic activity in the space*** [13]. Empirical evidence of the economists in the field of urban and regional development and geography shows that the effects of concentration (agglomeration and congestion) have a significant impact on the difference in the efficiency between the economic entities [14].

Spatial concentration or agglomeration of economic activity leads to the emergence of effects in the form of collective resources use [15]. This contributes not only to the better dissemination of knowledge [16], but also allows firms to gain a competitive advantage [17]. The foundations of the economic category of "agglomeration effects" were already laid in the works of I. von Tunen, A. Weber and A. Lesh.

Today, in the whole set of approaches to the study of agglomeration effects, it is customary to distinguish two directions: (1) the effects of localization economy – the effects of MAR or Marshall [18, 19] and (2) the effects urbanization economy – the effects of Jacobs [20]. Positive externalities of agglomeration economies represent a mutual benefit for companies from their joint location in a geographical area (Brenner 2000), which is a result of:

– direct effects between the existing firms in the industry – inter-firm collaboration, local information side effects, or the provision of venture capital by the existing participants;

– indirect consequences, when the companies' activity improves production conditions for the existing agents and contributes to the entry of new companies into the market – human capital accumulation, infrastructure or institutional support adapted to the needs of the industry);

– cross-industry effects when the supplier industry relies on the growth of the consumer sector [13].

The issues of the impact of agglomeration economy on the region's innovative development and economic growth were raised in [21], after which the topic became particularly relevant. Individual research schools have been emphasizing the positive impact of localization economies, showing that industry specialization in the regions is a positive factor for innovation development, as firms tend to learn from local firms in the same industry. Other researchers argued that a more diversified regional economy (i.e., Jacobs' externalities) will be more conducive to spreading knowledge, as firms get new and better ideas from other local firms working in other sectors of the economy [9].

Agglomeration effects are tested empirically. By the example of the American States, Siccone and Hall [22] it was shown that agglomeration effects are much stronger than the effects of congestion. Sveikauskas [23] found a positive correlation between labor productivity and the number of residents of the US cities. Shefer [24], Beaudry, and Schiffauerova [20] concluded that MAR effects are observed in 47% of cases, and urbanization effects are observed in 45%. Double growth of the city leads to an increase in productivity by 3–8% [25].

Let us analyze the level and nature of the Russian regions' specialization and determine the resulting agglomeration effects.

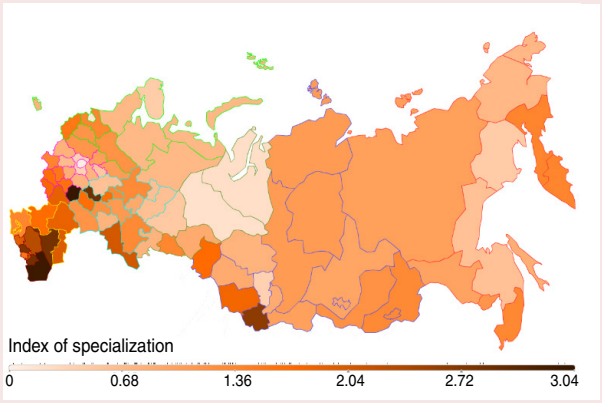
2. Specialization and agglomeration effects in the Russian regions

Analyzing the changes in the Russian regions' specialization, we can note that there were no significant changes in the period of 2005–2017. In agriculture, the level of

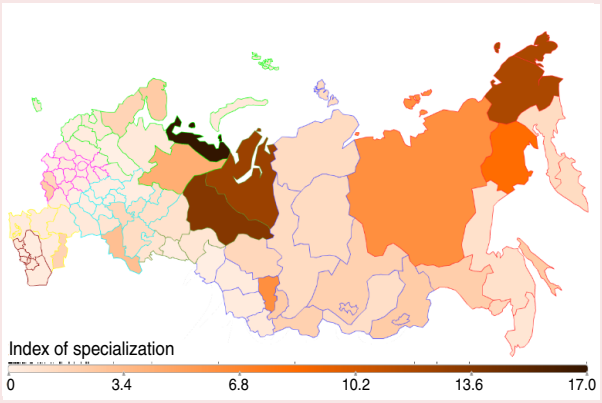
specialization increased slightly in 26 regions of the country (from 0.1 percentage points), decreased in 16 regions, and remained at the same level in 41 regions. In the extractive sector of the economy, the increase in specialization took place in the Nenets, Chukotka and Khanty-Mansi Autonomous okrugs (by 6.64, 5.27 and 1.78 percentage points, respectively), Astrakhan and Magadan oblasts (by 1.47 and 1.24 percentage points, respectively); in 22 regions, the level of specialization decreased slightly, while in the rest it remained constant.

In the manufacturing sector, specialization is not dictated by any natural factors, and there is little evidence that there are some changes in dynamics. In 30 regions, its level during the analyzed period increased slightly (within 0.7 percentage points), in 25 regions it decreased (within 0.2 percentage points). In the service sector, the decrease in the level of specialization (over 0.1 percentage points) occurred only in five regions of the country: the Khanty-Mansi, Chukotka, Nenets Autonomous o krugs (presumably in favor of the mining industry), in Chechnya and Ingushetia (in favor of agriculture). The regions' distribution by their specialization level in 2017 is shown in *Figure 1*.

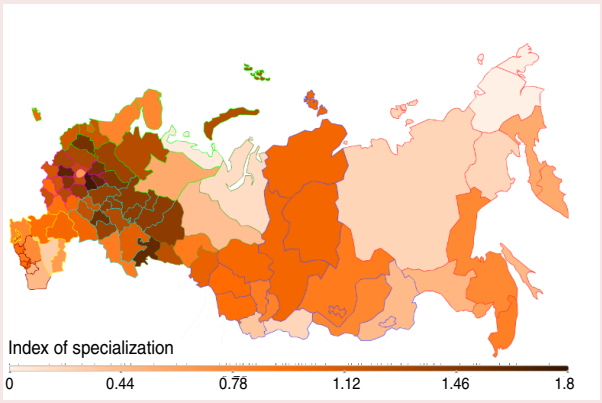
Fig. 1. Index of specialization of the Russian regions by economic sectors in 2017, the index



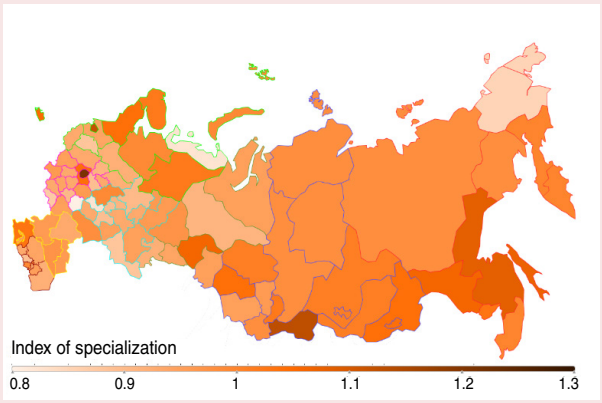
a) agriculture



b) mining industry



c) manufacturing industry



d) service sector

Calculated and compiled by the authors on the basis of the data from the Federal State Statistics Service of the Russian Federation.

We may see that the regions with a high level of specialization in different sectors of the economy are different. These include the Tambov Oblast, the republics of Dagestan, Chechnya, Mordovia, Kalmykia, Altai, Ingushetia, Kabardino-Balkaria, Stavropol Territory, and others. In these regions, specialization is determined by the natural and climatic conditions. But in the future analysis, we will see that it is important to use the available resources effectively, to identify a specific sector of the economy or a set of industries, the development of which will stimulate the emergence of agglomeration effects.

28 regions of Russia specialize in the mining sector of the economy. The leaders by this indicator include the Nenets, Khanty-Mansi, Yamalo-Nenets, Chukotka Autonomous okrugs, Magadan and Kemerovo regions, Yakutia and Komi. These regions' specialization is explained by the availability of minerals and may or may not create agglomeration effects, depending on the effectiveness of the existing prerequisites use.

Traditionally, a third of the regions have a higher-than-average level of specialization in the manufacturing industry [26]. In 2017, specialization in the manufacturing industry was observed in 38 regions of Russia (the index of specialization exceeded 1). The highest values can be noted in the Vladimir (1.74), Kaluga (1.64), Ivanovo (1.62), Chelyabinsk (1.59), Ulyanovsk (1.53), Novgorod (1.52), Yaroslavl (1.51) and other oblasts.

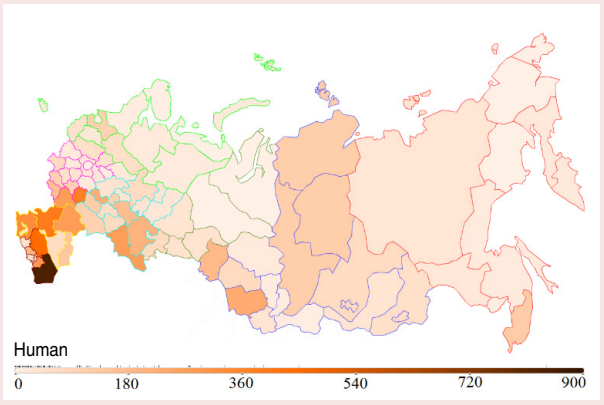
Only 20 regions of the country in 2017 had a specialization in the service sector (in 2005, there were 29 of them). Among the leaders are Moscow (the specialization index 1.21), Tyva (1.13), Saint Petersburg (1.12), Khabarovsk Territory (1.08). However, taking into account the fact that most labor resources of the country's economy are involved in the service sector, even a low level of specialization can contribute to significant agglomeration effects.

The economic sense of regional specialization is to identify those sectors of the economy in which the region can specialize, and to involve more resources in its development. Agglomeration effects are traditionally estimated by the number of employees *(Fig. 2)*.

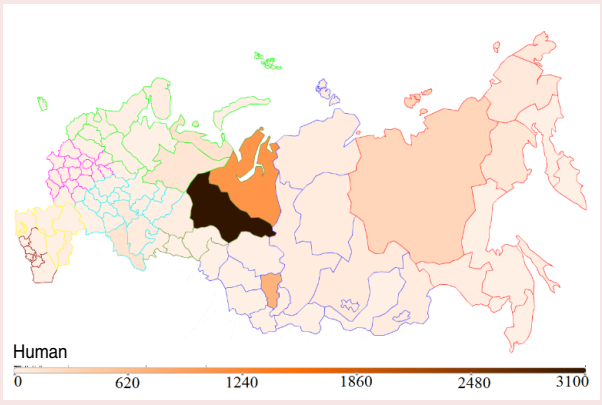
Agglomeration effect in agriculture is observed in many regions of the Federation, but in twelve regions it is more significant (over 200 people per year). We should note Dagestan (agglomeration effect is 840 people, growth since 2005 is 265 people), the Tambov Oblast (379 and 81 people respectively), Mordovia (221 and 82 people). In general, the size of the agglomeration effect for the period of 2005-2017 tends to decrease (by 2600 people). In the after-crisis period (2010 and 2011), there was a slight increase in the effect (by 1.19 and 0.48%, respectively), in the period of foreign trade relations complication (2015) there was a decrease by 12.44%. The calculations and conclusions obtained confirm the new economic geography (namely, the "core-periphery" model) in the following: when transport costs increase (which means all the conditions that complicate trade and lead to additional costs), economic activity tends to a more uniform spatial distribution, while improving the conditions for trade, it is concentrated in certain regions with a higher level of efficiency.

Agriculture and mining industries are low-mobility sectors of the economy, and if in the first of them changes in the agglomeration effect occur with some delay from changes in trade conditions, in the second it is much faster. Thus, in 2008, the value of the agglomeration effect increased by 45%, and in 2009 it decreased by 32.4% (mainly due to the Khanty-Mansi Autonomous Okrug). Since 2014, there have been no significant deviations in the value

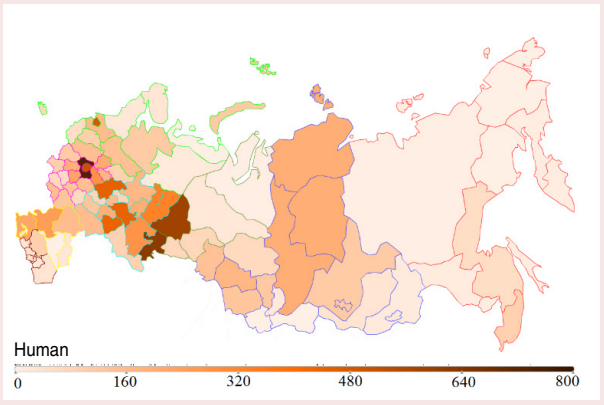
Fig. 2. Agglomeration effect of the Russian regions by economic sectors in 2017, people



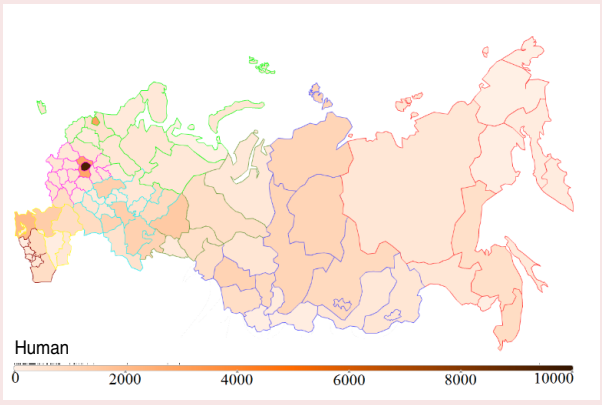
a) agriculture



b) mining industry



c) manufacturing industry



d) service sector

Calculated and compiled by the authors.

of the effect, as Russia's foreign economic policy has not affected this sector. It should be noted that the agglomeration effect (in the amount of more than 200 people) occurs in only four regions of the country – the Khanty-Mansi and Yamalo-Nenets Autonomous okrugs, in the Kemerovo Oblast and Yakutia.

Let us consider the dynamics of the agglomeration effect in manufacturing and services-sectors that theoretically should respond to the changes in the complexity of trade relations more strongly. The agglomeration effect in production more strictly follows the assumptions of the new economic geography: in 2009, the agglomeration effect decreased the most, by 13.35%, but already in 2010, its value has partially recovered. As for the service sector, the size of the agglomeration effect here exceeds the considered industries, in 2017, it amounted to 52,780 people in all Russian regions. The service sector is the most flexible one, foreign policy changes do not affect the agglomeration effect so clearly, in general, its value is tending to increase.

Analysis of the agglomeration effects presence showed that not all regions use the advantages of specialization. A case in point is Moscow where with a low specialization in the service sector (1.21), the agglomeration effect reaches 9,401 people (2017).

3. Research methodology and model specification

To determine the full use of the advantages of regional specialization in order to generate agglomeration effects, we propose a methodological approach including six main stages.

1. *Setting the assessment task* – to determine the nature and dynamics of regional specialization, calculate the agglomeration effects arising in the economy, and identify their impact on the socio-economic development of the region as a whole.

2. *Enunciating a general development model, selecting factors and directions of influence.* Conceptually, the agglomeration effects achieved in the region have a positive impact on the overall economic development. Modeling such an impact can be carried out in two ways. First, it is studying the indicators and locations of new foreign firms in the region. This analysis allows determining and justifying the companies' motives when locating their enterprises regarding the possibility of obtaining agglomeration effects. This approach is used in the works of strategic management (Alcácer and Chung, 2014). Second, it is using averaged indicators for the regions including labor productivity, wages, the level and number of employees, and the number of new employees [27]. This approach is observed in the works of economic variety, so we will stick to it. Thus, the defining model will be as follows:

$$Y = F(L, K, Infr, Innov, Aggl), \quad (1)$$

where Y is a dependent variable of socio-economic development,

L is labor indicators,

K is capital indicators,

Infr is infrastructure development,

Innov is innovation factors,

Aggl is agglomeration effects.

3. *Mathematical formulating of the problem, forming a system of indicators, calculating and analyzing the indicators of regional specialization and agglomeration effects.* We use indicators of agglomeration effects in four aggregated sectors of the economy – agriculture, mining, manufacturing and services. Besides, we propose to include a number of factors dictated by the provisions of neoclassical theory, endogenous growth, and some approaches determining the impact of innovation on the economic development of the region into the economic and mathematical model. Neoclassical models emphasize the role of physical capital as the main factor of economic development, while endogenous theories emphasize human capital as the main condition.

The dependent variable of the model defines the per capita gross regional product (GRP). The model will include the following factors: labor productivity (lab_{prod}), the region's share in the total number of employees employed in the economy (lab_{share}), the cost of fixed capital of the region's enterprises (*capital*), the density of paved roads (*roads*), the cost of technological innovations in enterprises (*tech_innov*), the agglomeration effects obtained in the region in agriculture (*agg_agr*), in mining (*agg_mining*), in manufacturing industry (*agg_manuf*) and in the service sector (*agg_serv*). The resulting regression model with constant elasticity will be as follows:

$$\begin{aligned}\ln(Y_{it}) = \alpha_{it} + \beta_{i2}\ln(lab_{prod_{it}}) + \beta_{i2}\ln(lab_{share_{it}}) + \\ + \beta_{i3}\ln(capital_{it}) + \beta_{i4}\ln(roads_{it}) + \beta_{i5}\ln(tech_{innov_{it}}) + \\ + \beta_{i6}\ln\left(agg_{agr_{it}}\right) + \beta_{i7}\ln\left(agg_{mining_{it}}\right) + \\ + \beta_{i8}\ln\left(agg_{manuf_{it}}\right) + \beta_{i9}\ln(agg_{serv_{it}}) + \varepsilon_{it},\end{aligned} \quad (2)$$

where Y_{it} is the GRP per capita projected over t time period;

α is a free term of the equation;

lab_{prod}, lab_{share}, etc. are the factors included in the regression model;

b_i are the parameters of the equation – regression coefficients for the studied factors;

i – the factor's sequential number.

The research period is 2008-2017, the object is 83 regions of Russia[1], the sources of primary statistical information are the collections and databases of the Federal State Statistics Service. Model calculations were made in the Gretl program.

4. *The analysis of the regional specialization and agglomeration effects indicators* was carried out in section 2 of this work.

5. *Building a system of economic and mathematical models of the impact of agglomeration effects on the region's socio-economic development.*

6. *Analysis and interpretation of the results obtained*. The fifth and sixth stages of the proposed methodological approach will be presented in the following sections of the work.

4. Analysis of the results obtained

To build an econometric model and determine the nature of the impact of agglomeration effects on the region's socio-economic indicators, it is necessary to identify the regions with a high level of specialization in agriculture, mining, manufacturing, and services[2]. The group of regions with a high level of specialization in agriculture includes 35 subjects of the Federation (the average index was 1.66 in 2008 and 1.8 in 2017); in the mining industry – 24 regions (4.56 and 4.48), and in manufacturing – 24 regions (1.35 and 1.38).

Let us consider the impact of agglomeration effects on the regions' socio-economic development. Three models were built for this purpose, for a group of regions with a high level of specialization in agriculture (Model 1), in the mining industry (Model 2), and in manufacturing (Model 3) *(Table 1)*.

The analysis allows drawing some conclusions. First, we can conclude that today labor (productivity and the region's share of the total number of employed in the economy) is a more significant factor for the Russian regions' development than capital (the cost of basic funds and the density of paved roads). An exception is a group of regions of the mining industry, where the growth of fixed assets by 1% provides an increase in per capita GRP by 0.107%. Moreover, for the regions of this group, the population factor is statistically insignificant, and the impact of labor productivity on the region's socio-economic development is inferior to other groups (it provides 0.8778% of the per capita GRP against 1.149% in the agricultural group and 1.065% in the manufacturing group). For a group with a specialization in mining industries, technological innovations are relevant (0.025% impact).

Second, agricultural regions receive the main incentive for development by increasing labor productivity, rather than by formally increasing the cost of fixed assets. These two trends can be connected as follows: investments in fixed assets have a negative impact on the socio-economic situation of the region in the current period (their impact is estimated

[1] The study does not include Crimea and Sevastopol due to insufficient statistical information.

[2] As a result of the grouping, only the cities of Moscow and Saint Petersburg, the Novosibirsk Oblast and the Primorye Territory were classified as regions mainly specializing in the service sector. Since the index of specialization in services for these regions was slightly higher than that for other sectors, it was decided not to exclude these regions from the sample, but to include them in other groups. So, the cities of Moscow and Saint Petersburg will be included in the group of regions with specialisation in the manufacturing sector (the index of specialization in services – 1.254, in manufacturing industry – 0.71; for St. Petersburg – 0.968 and 1.183 respectively). The Novosibirsk Oblast and Primorye Territory will be included in the groups of regions with agricultural specialization (Novosibirsk Oblast – 1.041 in services, 1.002 in agriculture; Primorye Territory – 1.059 and 1.015, respectively).

Table 1. Results of modeling of agglomeration effects influence on the regions' socio-economic development, 2008–2017

Variable	Model 1	Model 2	Model 3
l_const	10.307*** (1.324)	6.223*** (0.136)	9.002*** (0.827)
l_lab_prod	1.149*** (0.055)	0.8778*** (0.041)	1.065*** (0.022)
l_lab_share	0.389*** (0.13)		0.278*** (0.083)
l_capital	-0.09** (0.042)	0.107*** (0.032)	-0.053** (0.021)
l_roads	-0.098*** (0.01)	-0.056*** (0.013)	
l_teh_innov		0.025*** (0.006)	
l_agg_agr	-0.055** (0.023)		-0.024*** (0.007)
l_agg_mining		0.032*** (0.009)	
l_agg_manuf	0.05*** (0.017)	0.038*** (0.014)	-0.055*** (0.02)
l_agg_serv	-0.251*** (0.09)	-0.288*** (0.041)	-0.141** (0.071)
St. model error	0.14	0.099	0.062
R^2	0.926	0.987	0.985
Number of observations	350	218	240

*** – 1% significance level.
** – 5% significance level.
The standard error is shown in parentheses.
Compiled by the authors, the models are based on data from the Federal State Statistics Service.

negatively at the level of 0.09% of per capita GRP), but in the future they can increase labor productivity, which will have a positive impact on the region's development (impact at the level of 1.149%). We can draw similar conclusions for the regions of the manufacturing industry, with the difference that investments in fixed assets have a less negative impact on the region's development in the current period, and labor productivity growth brings less return in the future.

Third, the negative relationship between the density of roads with hard cover and per capita GRP in agricultural and industrial regions and the lack of such a relationship in mining areas indicate not that roads are not needed, but that they are no longer the main type of transport. Today, railway, sea (river) and air transport are becoming important, and in the mining industries pipeline transport is relevant for Russia. This specificity should be realized and taken into account when developing and implementing regional economic policy.

Fourth, agglomeration effects in agriculture do not have a positive impact on socio-economic development, even in agricultural regions. A similar conclusion can be drawn from the concentration of labor resources in the service sector, it does not bring an increase in per capita GRP. In agricultural regions, it is necessary to develop not only agriculture, but also manufacturing industry (the impact on per capita GRP is at the level of 0.05%).

Agglomeration effects in the manufacturing industry are also important for the mining regions. While in the regions with a high share of manufacturing industry, they are not sufficient for a positive impact on socio-economic development.

Conclusion.

Studying specialization and agglomeration effects in regional economic science is becoming more and more relevant. Among the set of works, we can distinguish such research groups that are based on the classification of Duranton and Puga, territorial and geographical approaches, the study of related diversity, the use of the cross-sectional analysis results, sorting processes, and the analysis of agglomeration economy. Agglomeration effects represent a mutual benefit for companies from their joint location on the geographic territory. The effects of localization and urbanization are highlighted. Agglomeration effects are tested empirically.

The analysis of the Russian regions' specialization and the agglomeration effects occurring in their economy has shown that not all regions can effectively use the existing level and nature of specialization. Modeling the impact of agglomeration effects on social and economic development has shown that in the groups of agricultural and industrial regions, labor remains the most significant factor, rather than capital; agglomeration effects in agriculture and in the service sector do not have a positive impact on the GRP level. The manufacturing sector development remains an important condition.

The proposed author's approach to determining the full use of the advantages of regional specialization will reveal the resources reserves in the economy, expressed in agglomeration effects. This method can be taken as a principal for regular monitoring of the regional economy effectiveness to obtain information about the nature and dynamics of specialization, the possibility of obtaining agglomeration effects in various sectors and the most significant factors of socio-economic development in general.

The research results will allow the Russian regions' government authorities to conduct a more reasonable economic policy in relation to the development of the existing specialization and related industries, as well as in the sphere of supporting business initiatives in the most efficient sectors of the economy.

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Stimulating Final Consumption within the Reduction of Regional Inequality*

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Abstract. With increasing regional inequality, the economy of the Russian Federation and its regions experiences structural constraints related to its imbalance. The result of this situation is the reduction of domestic consumer demand, which has recently been considered a factor of the economic growth. It actualizes the problem of finding, identifying, and justifying areas of final consumption which may stimulate the population's demand for goods and services of domestic production and reduce structural imbalances in current economic conditions. In this regard, the purpose of the study is to identify and scientifically substantiate ways to stimulate final consumption that reduce regional imbalances. One of these ways is tourism, which has a high multiplicative effect. It has the minimum share of import in the structure of the formation of its products' resources. The study's scientific novelty is the estimation of the effect of the increase of the tourism industry's output within the regional context. Its results allowed us to identify the problem of under-receiving effects from stimulating the consumption of tourism goods and services by regions. The high contribution of the Central Federal District, which accounts for the greatest effect from the growth of tourism output, indicates the need to overcome the existing spatial asymmetry in tourism development between certain regions of the country. General scientific methods of analysis, synthesis, comparison, generalization, as well as tools based on the methodology of inter-sectoral balance, were used as the methodological basis of the research. The information basis of the research

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included works of domestic and foreign scientists dealing with structural policy, information from state statistics institutions, data from the World Bank and the World Tourism Organization. Future research areas are related to the definition of methods for regulating final consumption for a deeper understanding of problems of economic restructuring.

Key words: economy, economic inequality, final consumption, tourism.

Introduction

Current post-industrial economy is characterized by an aggravated problem of inequality, which is present in all spheres of society. A high level of differentiation of socio-economic parameters is reflected in the decline of overall economic activity, which negatively affects the level and quality of life of the population and reduces opportunities for implementing human potential. Inequality issues are reviewed by scientists not only through the prism of social differentiation, in particular, uneven distribution of income, but it is also treated more broadly. Thus, there are such types of inequality as interpersonal, interethnic, gender, global, interregional, intraregional, economic, political, social, horizontal, vertical, inequality of opportunities, and so on. Recently, there has been a significant increase of interest in the study of economic inequality among researchers. It is associated with the publication of the book "Capital in the Twenty-First Century" by the French economist T. Piketty in 2015. The scientist proved that wealth concentration will increase if the level of capital return exceeds the economic growth level. It will lead to a significant stratification of society [1].

The Russian Federation has a high level of regional inequality: according to this indicator, it is one of the leading countries along with European and Central Asian states. Russia is ahead of several developing BRICS countries like Brazil, India, and China [2]. This circumstance hinders the economic growth in the country, which significantly depends on a volume of domestic consumer demand. At the same time, there is a trend according to which increasing inequality leads to a decline of domestic consumer demand at a constant level of income as a majority of citizens reduce their costs, and the most affluent segments of society spend their income on its accumulation or consumption of exclusive, often imported, goods and services, which leads to the decrease of demand for domestic products [3; 4]. A primitive consumption structure of the majority of Russians, in which a main item of expenditure is the purchase of basic necessities, limits the economic growth's prerequisites. In this regard, it is important to optimize the population's structure of consumption by investing in human capital (increasing expenditures on education, health, recreation, and leisure activities). It is especially relevant for low-income population groups whose additional consumption will be fulfilled mainly by goods and services of domestic production. It is worth noting that Russian economic scientists has thoroughly studied and described in numerous publications issues related to the differentiation of a society by income level, poverty, and consumption structure at the national level. At the same time, within conditions of increasing regional inequality and increasing structural deformations that occur at all stages of the reproduction process, the

need to identify and scientifically substantiate directions for stimulating final consumption that reduce regional disparities increases. It was the purpose of the study.

An achievement of this goal required an analysis of the status of this structural economic element and an assessment of the territorial distribution of the effect obtained in the implementation of areas for final consumption stimulation. The information basis of our study included works of domestic and foreign scientists studying structural policy issues, as well as information from state statistics bodies, data from the World Bank, and the World Tourism Organization. The study reveals current trends of the formation of final consumption, it contains an assessment of an impact of stimulating final consumption on the economy at the regional level. It is a scientific novelty of the research.

Theoretical aspects of the research

An analysis of theoretical works on problems of structural imbalances in the regional context showed that researchers have recently started to pay attention to the study of regional differentiation according to investment into a fixed capital [5], consumer and financial behavior of the population [6], resource availability [7], and others. At the same time, aspects of regional inequality in relation to the most important component of the reproduction process, such as final consumption, remain poorly studied. According to the methodology of the system of national accounts, it is formed by total expenditures of households, public sector, and nonprofit organizations (NPOs) that serve households without making a profit. Summarizing works of domestic and foreign authors, who study structural economic transformations [8–19], it is possible to conclude that final consumption, as an element of the reproductive system, is the most important factor of the economic growth. Regulation of final consumption involves the stimulation of consumer demand.

In Russia, this process is limited by an insufficient volume of real disposable monetary income of the population. According to Rosstat, at the end of 2019, a value of this indicator was 6.4% lower than in 2014. According to experts, insufficient investments in human capital hinder the improvement of Russians' well-being[1]. In comparison with developed foreign countries, a volume of expenditures on high-quality education, healthcare, and recreation services in Russia is significantly lower [20]. Despite the fact that development of human capital involves an associated growth of all its components, it should be taken into account that a time of the demonstration of an impact of public sector's investments into a particular component on the economy is not the same. For example, according to the International Monetary Fund, the increase of the efficiency of government investments in school construction will only surpass the efficiency of road construction costs in two decades[2]. In this regard, it may be promising to allocate funds to ensure high-quality recreation of the population, which is implemented as a part of the domestic tourism functioning[3]. Investments in a relevant industry have a significant multiplying macroeconomic effect: among all service industries, a multiplier

[1] Risk of inactivity: RAS academician assessed economic prospects of Russia. *RIA Novosti*. Available at: https://ria.ru/20191124/1561469566.html?utm_source=yxnews&utm_medium=desktop&utm_referrer=https%3A%2F%2Fyandex.ru%2Fnews

[2] Lomskaya T. How and why are authorities going to increase human capital? *Vedomosti*. Available at: https://www.vedomosti.ru/economics/articles/2018/05/24/770536-umnozhat-chelovecheskii-kapital

[3] In this study, terms "tourism", "tourism industry", "tourism sector" are synonyms.

for the tourism industry corresponds to the highest value [21]. According to NRU HSE experts, the current economic situation in Russia is shaped by a higher level of household income security in comparison with 1991. It creates additional opportunities for development of the tourism industry, a volume of which significantly expands due to the redirection of flows to domestic tourism [22].

A link between tourism development and its impact on human capital is confirmed by works of Russian and foreign scientists. Thus, attention is paid to development of methodological approaches to the study of regional processes of tourism development and human capital [23]. In another paper, using econometric methods on 25 African countries, an impact of the functioning of the tourism industry on development of human capital is justified [24]. Italian scientists, after a study conducted in 63 countries in 1996–2008, revealed that tourism has the greatest impact on the growth of education [25]. A positive impact of increased investments in tourism on stimulation of the economic growth is proved by the Iranian economy [26]. Everything aforementioned allows reviewing the increase of a volume of population's consumption of tourism goods and services[4] within the country[5] as one of promising areas for stimulating final consumption.

Research methodology

General scientific methods of analysis, synthesis, comparison, and generalization were used to analyze final consumption and justify areas of its stimulation. To assess a territorial distribution of the effect of the tourism industry's increased output, a method of inter-sectoral balance was used. This method makes it possible to conduct scenario-based inter-sectoral modeling of the economy. An inter-sectoral model, based on a basic equation of the inter-sectoral balance in matrix form, is used as a tool for forecast:

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

where x is a vector of total production output;
A is a matrix of direct costs' coefficients;
y is a vector of a final product.

An equation was used in a simulation:

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

where E is the identity matrix;
$(E - A)^{-1}$ is a matrix of total costs' coefficients.

On a basis of obtained matrix dependence, it is possible to calculate what should be a volume of x sales in all economic sectors, if it is planned to change final demand y.

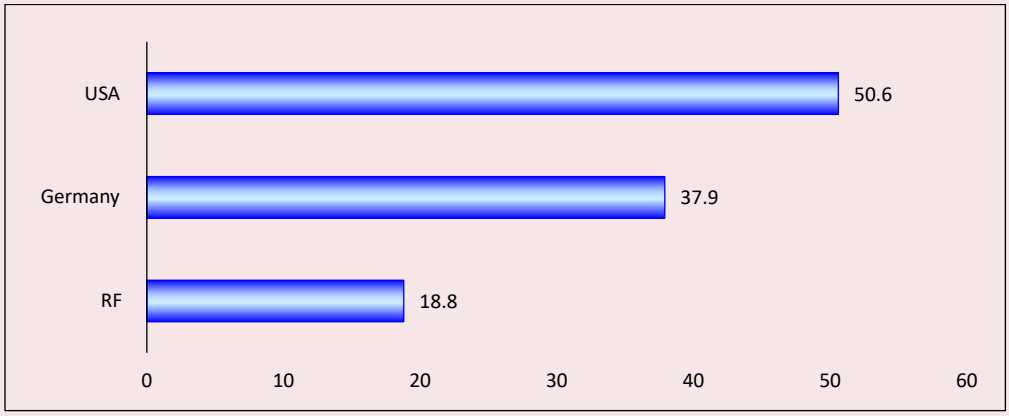
The model includes the "tourism" type of activity, which is not presented separately in Russian statistics. To calculate tourist output and tourist value added by types of tourism-related activities, we used methodological tools based on aggregation of data describing shipment of goods, performance of works, and provision of services by Russian enterprises [21].

On a basis of target indicators for development of the tourism industry, set in program and strategic documents, the forecast growth rate of the tourism industry until 2024 was calculated. Further, based on the inter-sectoral model, a volume of tourism products sales is calculated with the increase of final demand for it, taking into account received forecasts. The contribution of tourism to the additional growth of a number of employees and a wage-fund was also assessed.

[4] Tourism goods and services are understood as goods and services offered on the tourism market, using a special classification of products and economic activities according to the methodology of the tourism satellite account (TSA).

[5] According to the TSA methodology, consumption, related to domestic tourism, includes tourist consumption of resident visitors within the economic territory of the country concerned.

Figure 1. Final consumption by PPP per capita in 2018, thousand US dollars



Source: data of the World Bank.

Table 1. Domestic demand in Russia, trillion rubles (in constant prices)

Indicator	2014	2015	2016	2017	2018	2019	2019 to 2014, %
Domestic demand	90.3	82.2	81.2	84.5	86.1	88.3	97.8
Final consumption	67.8	62.4	61.4	63.5	65.2	66.8	98.5
households	51.3	46.4	45.2	46.9	48.5	49.6	96.7
state administration	16.2	15.6	15.8	16.2	16.4	16.9	104.3
nonprofit organizations that serve households	0.4	0.3	0.3	0.3	0.3	0.4	100.0
Gross accumulation	22.5	19.8	19.8	21.0	20.9	21.5	95.6
For reference							
Export	20.7	21.5	22.1	23.2	24.5	24.0	115.9
Import	24.5	18.4	17.7	20.8	21.3	21.8	89.0
Source: Rosstat data.							

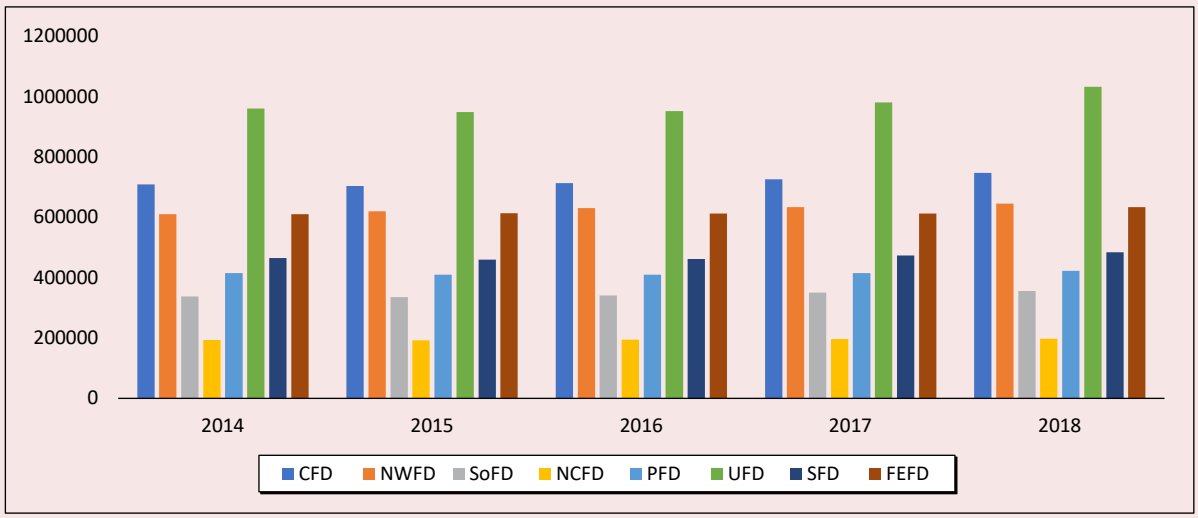
Main research results

Final consumption and the problem of regional inequality in Russia

According to the World Bank, Russia is significantly inferior to major foreign powers in terms of final consumption per capita in a recount according to purchasing power parity (PPP). Final consumption in Russia is nearly three times lower than in the US, and half as low as in Germany (*Fig. 1*).

Limitation of the consumption of goods and services by main institutional units (population, state, NPOs) reduces an ability of enterprises to increase production volumes by decreasing all economic agents' income. In the structure of Russian domestic demand, in 2014–2019, a share of final consumption remained virtually unchanged: it was, approximately, 75–76%. According to official statistics, domestic demand in the Russian Federation decreased by 2.2% during the studied period (*Tab. 1*). Negative dynamics of this indicator in a current period is caused, among other things, by the decrease of final consumption – its volume decreased by 1.5%. At the same time, a volume of household consumer demand decreased quite significantly – a decline was 3.3%. Despite 4.3% growth of consumers' expenses in public administration sector, it should be noted that, due to its low share in the structure of domestic demand, it does not have a significant impact on the economy.

Figure 2. Gross regional product per capita by federal districts of the Russian Federation, rub. (in constant prices)



Source: own compilation according to Rosstat data.

Thus, it is most appropriate to activate domestic demand by stimulating the consumption of household sector as a main and final consumer of manufactured products in the economy. Thus, analysts of the Institute of Economic Forecasting of the Russian Academy of Sciences regard a possible increase of consumers' expenditures in 2020–2021 as a way out of a stagnation "trap", a priority stage on a way to the Russian economy growth[6]. This process is limited by existing structural imbalances in the country's economy due to uneven regional development.

Preservation of high differentiation in regions' economic development, an imbalance in the distribution of productive forces, coupled with weak population mobility, strengthen the processes of regional inequality, as evidenced by GRP per capita (*Fig. 2*).

These processes also create imbalances in the formation of final consumption in regions. A case of one of export-oriented regions of the Northwestern part of Russia is significant. In the Vologda Oblast, a volume of actual final consumption of households per capita was 1.5 times lower than average data for the district in 2014–2018. At the same time, the growth rate of this indicator is one of the lowest in the Northwestern Federal District, which does not contribute to the structural balance of the regional economy [27; 28].

Structure of consumer expenditures and its transformation

An analysis of dynamics of the population's consumer expenditures from 2014 to 2018 showed that the structure of consumption of Russians is characterized by a high share of food expenses (*Tab. 2*). Thus, in 2018, the share of food and beverages in household consumption was about 31%. During this period, the growth of the indicator was 2.3 p. p., which indicates the reduction of the ability of the population to

[6] Main directions of long-term forecast of socio-economic development. The Institute of Economic Forecasting of the Russian Academy of Sciences. Available at: https://ecfor.ru/publication/dolgosrochnii-prognoz-sotsialno-ekonomicheskogo-razvitiya/

Table 2. Dynamics of the structure of households' consumer expenditures, %

Type of product	2014	2015	2016	2017	2018	2018 to 2014, p. p.
Food and non-alcoholic beverages	28.5	32.1	32.3	31.2	30.7	+2.3
Alcoholic beverages, tobacco products	2.8	3.0	3.1	3.0	3.0	+0.3
Clothes and shoes	8.9	9.2	9.2	8.8	8.0	-0.9
Housing services, water, electricity, gas, and other fuels	10.3	10.8	11.3	10.9	9.9	-0.4
Household items, appliances, and home maintenance	6.3	5.5	5.9	5.3	5.4	-0.9
Healthcare	3.6	3.7	3.6	3.8	3.8	+0.2
Transport	17.8	14.4	13.3	16.0	16.7	-1.1
Communication	3.4	3.3	3.3	3.1	3.2	-0.1
Organization of leisure and cultural activities	7.1	6.7	6.7	6.9	7.8	+0.7
Leisure services	1.4	1.6	1.7	1.6	3.5	+2.1
Education	1.0	0.9	0.8	0.8	0.8	-0.2
Hotels, cafes, and restaurants	3.6	3.5	3.5	3.3	3.5	-0.1
Other products and services	6.8	6.9	7.1	6.9	7.0	+0.2
Source: Rosstat data.						

spend money to ensure a better quality of life and direct it toward the consumption of other categories of goods and services. The increase of households' food expenditures is caused by the lack of positive dynamics in real disposable income, as well as the increase of food prices[7].

In general, the structure of Russian consumption is quite conservative, and it practically does not change over time, but an analysis of its dynamics allowed us to note some adjustments. Thus, in 2017–2018, the share of expenditures on leisure activities increased by 2.1 times, which may be caused by the increase of the income of the most affluent households over the same period[8], which, according to the Engel's law, is characterized by the increase of expenditures on education, medicine, recreation, and entertainment with the increase of monetary income. It indicates a trend of social stratification, which makes it difficult to reproduce human capital of a significant part of the population and, consequently, to ensure the economic growth. Thus, reduction of the inequality in the consumption of goods and services may be considered as a source of increased consumer demand.

According to Russian scientists, the transformation of the consumption structure of households with resources for development should be carried out primarily on the basis of such development drivers as expenditures on transport, communications, recreation, and culture, and then – at the expense of expenditures on services of the hospitality industry (catering and hotel services), as well as housing and communal services. At the same time, it is noted that expenditures on health and education cannot act as such driver due to the fact that corresponding high-quality paid services in this sphere are available only for a small part of the population with high incomes [29]. It may be concluded that tourism, as an industry that includes transport services, hotel services, activities of public catering,

[7] Inequality of household consumption. *Bulletin of Current Trends of the Russian Economy*. Available at: https://ac.gov.ru/archive/files/publication/a/20223.pdf

[8] According to Rosstat, from 2017 to 2018, the most noticeable changes in the distribution of total monetary income within 20 percent of population groups were observed in the group with the highest income. The share of wealthiest Russians increased from 46.9% to 47.1%.

communication organizations, cultural, and leisure institutions, may be considered as a catalyst for consumer demand from the general population.

Studies showed that the increase of average monthly incomes of Russians (per household member) by 5 thousand rubles in 2018 prices will cause the increase of consumer expenditures among the least affluent households by 4.2 thousand rubles. Out of it, at least 80% will be spent on the purchase of goods and services of domestic production thereby stimulating domestic demand. Within all income groups of the population, along with the increase of expenditures on food and services, clothes, the increase of expenditures on transport, recreation, and cultural events will be quite noticeable [30].

A role of tourism development while increasing the level of human capital is quite significant. In corresponding studies, it was revealed that the creation of jobs through increasing tourism sector generates the growth of expenditures on food, and resulting funds are used by the population for increasing literacy. Revenues from state investments in tourism may be used to provide better education and health services [24].

Importance of tourism being a promising area for stimulating final consumption in the Russian Federation is determined by the fact that there is an unimplemented potential for consumption of tourist services by residents within the country. According to VCIOM, averagely, only 43% of Russian residents over the past five years have had a vacation outside their region of residence (*Tab. 3*) (for comparison, 80% of the population travels in Japan and Germany, and 70% – in the UK).

At the same time, the share of Russians who spend their holidays at home increased by 2.5 times in 2015–2019[9].

Russia is significantly inferior to foreign countries in terms of a number of tourists (*Fig. 3*). Therefore, the contribution of the tourism industry to the growth of final consumption could be higher.

It is confirmed by data for population's expenditures on consumption of tourist goods and services within the country (*Tab. 4*). In 2014–2018, a volume of tourist consumption in Russia decreased by 6.4%, while a value of this indicator in other countries shows a positive trend.

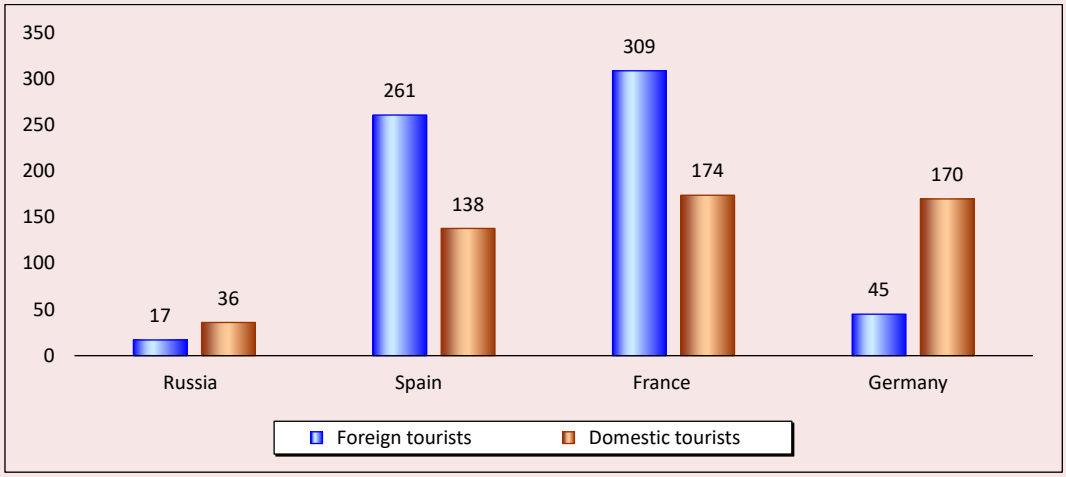
Among world leaders in terms of population's expenditures, China stands out. It is where the growth rate in the analyzed period was 56.2%, which could be explained by a great attention to development of domestic tourism. According to forecasts, by 2020, a volume of domestic tourist

Table 3. Distribution of responses from Russians regarding spending vacations in the country outside a home region

Over the past five years, have You gone on vacation or spent holidays in other regions of Russia? (closed question, one respond option , % of a number of respondents)						
Option	All respondents	18–24 years old	25–34 years old	35–44 years old	45–59 years old	60 years old and older
Yes, once	16	21	21	19	13	11
Yes, twice or more	27	36	34	30	26	18
No, I have not	57	43	45	51	61	71
Hesitate to answer	0	0	0	0	0	0
Source: 2019 Summer Results. *VCIOM*. Available at: https://wciom.ru/index.php?id=236&uid=9917						

[9] Source: 2019 Summer Results. *VCIOM*. Available at: https://wciom.ru/index.php?id=236&uid=9917

Figure 3. Number of tourists per 100 residents in different countries in 2018, people



Source: Eurostat data.

Table 4. Dynamics of expenditures on consumption of tourism goods and services by residents, billion US dollars (in constant prices)

№	Country	2014	2015	2016	2017	2018	2018 to 2014, %
1	USA	771.7	783.6	798.5	830.1	857.5	111.1
2	China	497.4	560.5	638.8	711.5	776.7	156.2
3	Germany	305.8	297.0	301.3	310.3	315.1	103.0
4	Japan	183.4	196.8	195.7	201.1	202.8	110.6
5	Great Britain	159.6	169.7	181.2	193.9	200.1	125.4
6	India	147.9	161.3	176.1	184.1	196.6	132.9
7	Italy	140.7	150.9	152.5	158.3	161.0	114.4
8	Mexico	121.5	130.9	130.5	133.6	136.8	112.6
9…	France	129.2	128.4	130.1	131.3	135.7	105.0
…16	Russia	43.9	41.4	42.2	42.6	41.1	93.6
Source: data of the World Tourism Organization.							

flow in China will exceed 6 billion people [31]. In order to further stimulate its growth and increase domestic consumption in the tourism area, prices for domestic tourism services (entrance tickets to tourist sites, transport tickets, etc.) are regulated at the legislative level.

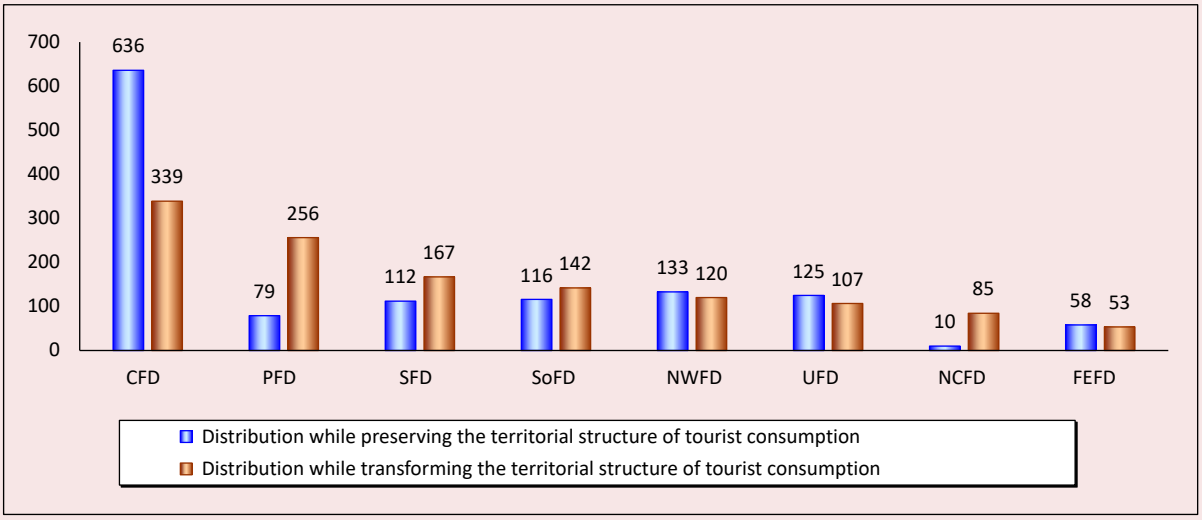
Russia's lag in this area is explained, among other things, by the lack of the state's necessary attention to tourism, which could become a promising and highly profitable branch of the national economy. For a long time, the tourism sector was not perceived by authorities as a catalyst of economic development. It changed only at the end of 2018. The state understood that tourism could be a driver of the economic growth. It led to the transition of the Federal Agency for Tourism from the subordination of the Ministry of Culture to the Ministry of Economic Development of the Russian Federation.

In 2019, the Russian government adopted the Strategy of Tourism Development for the Period up to 2035. It sets basic guidelines for the industry's functioning. In particular, the

Table 5. Target indicators for tourism development in the Russian Federation until 2035

Indicator	2017 (fact)	2025 (forecast)	2035 (forecast)
Number of domestic tourist trips per 1 resident of the Russian Federation per year	0.4	0.6	1.0
Gross value added of the tourism industry, trillion rubles	3.2 trillion rubles	6.1.	16.3
Export of tourist services, billion US dollars	8.9	15.7	28.6
Investments in the tourism sector, index, %	100	150	300
Source: *The Strategy of Tourism Development for the Period up to 2035*: the RF Government's Decree no. 2129-p., dated September 20, 2019. Available at: http://government.ru/docs/37906/			

Figure 4. Increase of gross product output after stimulating consumption of tourism goods and services by federal districts, billion rubles



Source: calculated on the basis of inter-sectoral modeling.

document indicates that the contribution of tourism to the country's GDP, in comparison with the 2017 level, should increase by 5.1 times, and a number of domestic tourist trips per resident of the Russian Federation per year should increase by 2.5 times (*Tab. 5*).

In addition, in accordance with the Spatial Development Strategy of the Russian Federation until 2025[10], tourism is a priority industry for most Russian regions.

Ways to reduce regional inequality

In the context of achieving these indicators, as well as reducing regional inequality, it is important to have an idea of how the main effect will be distributed after increased demand for tourism products.

Based on the cross-industry modeling tools, it is determined what territories will experience this effect in the following scenarios:

– maintenance of the existing territorial structure of tourist consumption;

– transformation of the territorial structure of tourist consumption in accordance with a district's population *(Fig. 4)*.

[10] *The Spatial Development Strategy of the Russian Federation until 2025:* the RF Government's Decree no. 207-p, dated February 13, 2019. Available at: http://static.government.ru/media/files/UVAlqUtT08o60RktoOXl22JjAe7irNxc.pdf

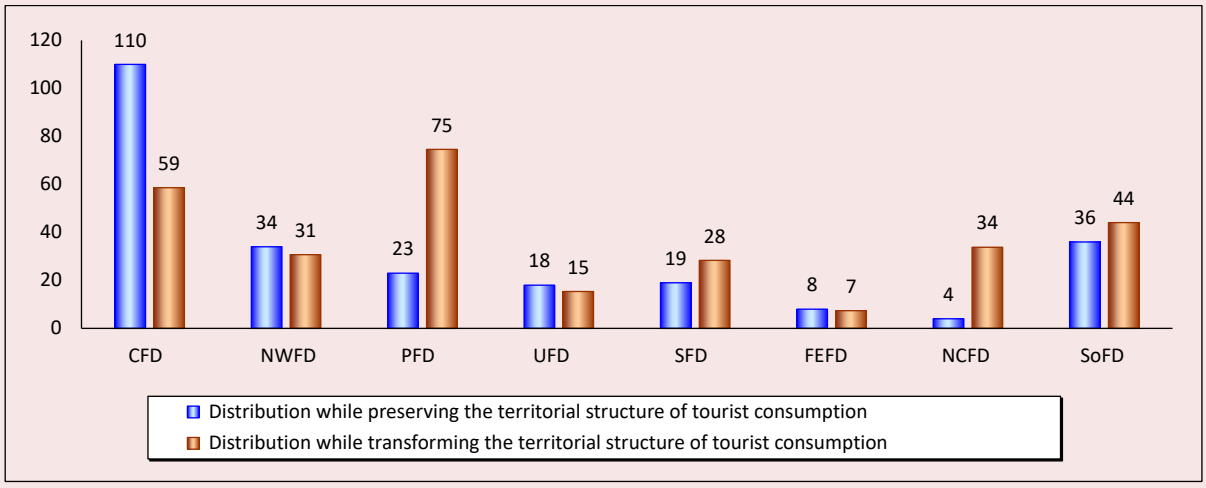
Based on the results of calculations, it was revealed that, in both cases, the growth of gross product output after increased population demand for tourism products will happen in the Central Federal District. This circumstance could be explained by the fact that this district is a home for one of the world's largest cities: a city of federal importance – Moscow, which has a significant tourist potential by generating a tourist flow. At the same time, while modeling the growth of demand for tourist products proportionally to federal districts' population, the distribution of the effect will be more uniform: the CFD share in this case will be 27%, not 50%. As the result, other territories will receive an additional increase of gross product output. Thus, the share of Privolzhsky Federal District will increase from 6 to 20%, which might be caused by a high concentration of potential consumers of tourism goods and services living there. This district is the second one in the Russian Federation in terms of population. Thus, increased consumer demand will provide a greater increase of gross product output.

There will also be a significant redistribution of the effect as a result of the growth of tourist consumption in the SFD, SFD (Southern), and NCFD.

It indicates a current territorial asymmetry of tourism development in the country, as well as the lack of regional effects from the growth of consumption of tourism goods and services. Thus, taking into account the fact that nearly all territories of the Russian Federation have a tourist potential, it is advisable to create conditions under which the demand for tourism products will be regulated in accordance with a number of federal districts' residents.

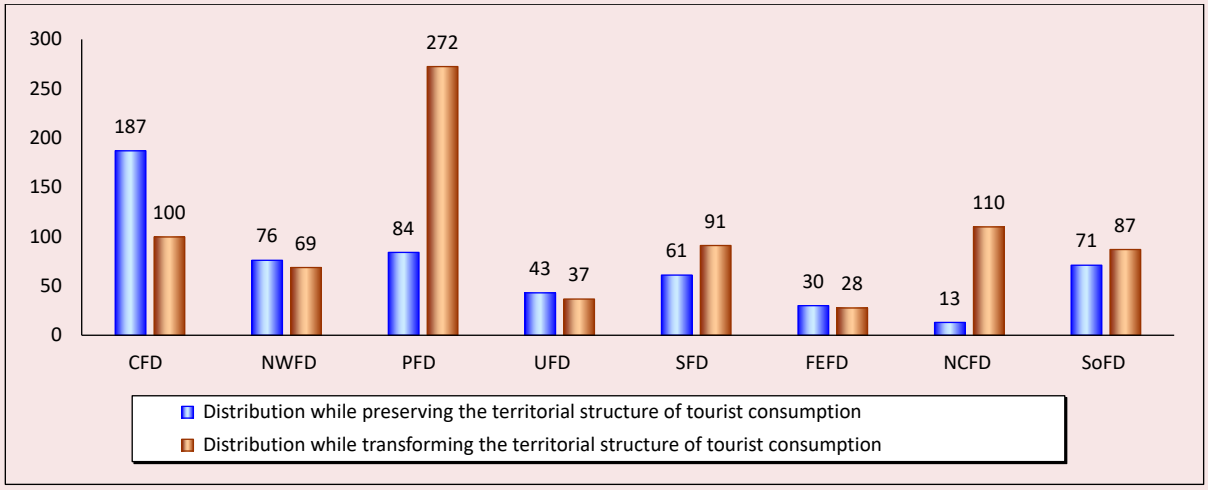
The increase of gross product output, caused by the demand for tourism goods and services, will ensure a corresponding increase of employment and the wage-fund in regions (*Fig. 5, 6*).

Figure 5. Territorial distribution of the increase of the wage-fund caused by the growth of tourist consumption in the Russian Federation, billion rubles



Source: calculated on the basis of inter-sectoral modeling.

Figure 6. Territorial distribution of the increase of the number of employees caused by the growth of tourist consumption in the Russian Federation, thousand people



Source: calculated on the basis of inter-sectoral modeling.

According to the results of scenario modeling, it may be noted that, in case of the increase of demand for tourist products, considering the population of federal districts, the distribution of effects across the country is distributed more uniformly. At the same time, a role of the Central Federal District, which previously served as a main beneficiary of the increase of key economic indicators, is being significantly transformed. There is an improvement of regions-outsiders' positions. Thus, a significant effect in the form of the increase of the wage-fund and a number of employees was recorded in the North Caucasian Federal District.

Thus, the results of calculations allowed us to identify a scenario according to which the distribution of the effect of the growth of the tourism industry's output contributes to the reduction of regional inequality. It requires a more reasonable approach toward conducting policies for regulating domestic demand.

To sum up, it should be noted that the implementation of economic policies by government authorities aimed at stimulating domestic consumer demand in Russia and its regions should take into account the existing regional inequality. It consists of an uneven territorial distribution of effects when demand for manufactured goods and services increases. This circumstance dictates the need to implement measures for balanced socio-economic development of Russian territories.

Conclusions

The study revealed significant territorial disparities that exacerbate a problem of regional inequality. The absence of significant changes in indicators like GRP per capita, a volume of actual final consumption of households per capita indicate a high level of inter-regional differences. In this situation, the stimulation of final consumption by adjusting the structure of consumer expenditures may help reduce regional differentiation. The increase of an importance of human capital within

the solution of the problem of ensuring the country's economic growth raises the question of a qualitative change in consumption, the increase of the share of services in its structure in terms of development of education, health, culture, recreation.

It may be concluded that a significant potential for consumption of tourism goods and services is not sufficiently implemented in the modern Russian economy. The forecast for domestic travel demand, as the result of the impact of the COVID-19 coronavirus pandemic, is rather ambiguous. On the one hand, due to restrictions concerning abroad travels, people's interest in tours around Russia may significantly increase. It contributes to the complexity of the structure of household consumption toward increased expenditures on tourism goods and services. In addition, a well-known Russian public association "Opora Russia" initiated the creation of a national project for tourism development. An important step in development of the tourism industry in the Russian Federation was the transition of the Federal Agency for Tourism from the subordination of the Ministry of Economic Development to the Russian Government. The Department has been assigned with the task of developing and implementing state policy and legal regulation in an area of tourism and tourism activities in the country.

At the same time, demand for domestic tourism may decrease due to a decline of the population's solvent demand as the result of strict quarantine measures in the country, declining oil prices, and export demand.

The results of cross-industry modeling allowed us to justify the importance of optimizing the consumption structure of Russian households within the reduction of territorial disparities. Effects of additional growth of a number of employees and the wage-fund, resulting from the same demand in all districts of the country, are distributed more evenly throughout the country, and it contributes to the reduction of regional inequality. While taking into account existing consumer potential and prospects for stimulating final consumption, it is necessary to implement measures related to the change of the structure of the population's consumption. It will be facilitated by optimization of consumer demand for goods and services of domestic production through the increase of its competitiveness, and the implementation of policy aimed at the increase of the population's income by regulating minimum wage rates, ensuring the availability of consumer credit mechanisms, increasing the income level of the least wealthy segments of the population, and reducing households' tax burden.

It should be noted that development of methodological tools for assessing its contribution to the economy will help stimulate final consumption. It will provide a more reasonable approach to determining main indicators of economic development while creating corresponding programs.

Scientific significance of the research is development of scientific provisions concerning the justification of areas for stimulation of final consumption, development of methodological tools in order to assess its impact on the country and regions' economy on the basis of inter-sectoral balance. Practical significance is an opportunity to use the study's results by authorities while determining areas that ensure structural changes. The following work will touch upon the identification of methods to regulate final consumption for a deeper understanding of problems of the economy' structural adjustment.

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Modern Ways to Boost Economic Growth in Regions*

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Abstract. The paper reviews Russian and foreign research on modern ways to boost regional economic growth on the example of regional development institutions. We have chosen project management and regional development agencies as the most promising institutions for regional development. The growing interest in project management is confirmed by the data of the international database *ScienceDirect*, in which the number of articles on this topic for 1996-2019 was 19.5 thousand, and their annual number has increased 3.8-fold during this period. There is a similar trend in Russia: according to the electronic library *eLIBRARY.RU* the number of articles on this topic for the period from 2000 to 2019 has increased 87.5-fold, and their total number for this period was 1.2 thousand. Our main research method is cross-country comparative analysis. We investigate advantages and disadvantages of project financing on the examples of the Sydney Opera House (Australia), the Olympic Stadium in Montreal (Canada), the Concorde supersonic airliner (France–UK), the Suez Canal (Egypt), the Hubble Space Telescope (USA–EU), the Humber Bridge (UK). While studying international experience of regional

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development agencies, we have classified them into three types: agencies for ensuring regional leveling within the country (Scotland, Australia, Canada); agencies for ensuring economic leveling within an international association of countries (EU—Poland, Romania, Portugal); agencies that help countries join the world's leading nations on the basis of the innovative economy (China, Malaysia, Botswana). A summary analysis of the works that study the activities of regional development agencies has allowed us to present the institutions under consideration on a system-wide basis and to identify their weak and strong points that should be taken into account in the development of this tool that helps enhance economic growth in Russia's regions.

Key words: regional management, regional development institutions, project management, project financing, regional development agencies.

Introduction

The modern world economy is experiencing a slowdown in its pace of economic growth, as production growth rate is declining dramatically in comparison with previous decades. Recent global events related to the coronavirus pandemic, the fall in oil prices, and the shutdown of enterprises are threatening to exacerbate this trend.

Such a situation is likely to have the gravest effect on the territories that lie outside economic activity hubs and whose catch-up development is the responsibility of regional authorities. More than half a century of international experience in various countries has shown that there exist certain effective tools to achieve rapid economic growth. Suffice it to recall the following examples: reconstruction of the economies of Germany, Austria, France, the USSR, and others that were destroyed during the war; economic development of the countries of Eastern and Central Europe after their accession to the EU; and the Asian economic miracle. Despite the differences these countries may have, their development strategies share common features related to the implementation of institutional reforms and regional development policies [1].

World practice has shown that to address issues related to economic development of territories in conditions of cultural, institutional and technological restrictions it is necessary to have a system of special institutions that can implement non-standard schemes for regional development projects. Thanks to this policy, growth points can be created in the regions that have a large economic multiplier and generate growth in related industries, thereby initiating significant economic activity.

At present, Russia is in urgent need of effective mechanisms to launch regional economic growth. This need is caused, on the one hand, by a sluggish growth in previous years, on the other – by the necessity of equalizing development levels of the territories between which there already exists a huge gap that is increasing continuously. In this regard, the accumulated international experience in implementing progressive forms to boost regional economic growth can give Russia organizational benchmarks for establishing similar institutions on its territory, taking into account its national specifics. Obtaining these benchmarks involves taking a closer look into the available range of regional development institutions (RDIs)[1]. In this regard, the goal of our present paper is to search for and study

[1] We should note that the notion of "region" in the context of RDIs can vary from narrow (applied directly to regions as parts of a country) to broader (meaning a separate territory or country). depending on the purpose of RDI activities.

modern literature on the experience of the most promising RDIs for their subsequent adaptation in Russia.

Regional development institutions: general overview

Various RDIs have become an integral part of the administration system in any developed country. Being a tool of state innovation policy, they represent the standards of interaction between economic agents, and their application leads to a change in the state of the system [2]. By accumulating financial resources and redistributing them to the most promising projects, RDIs not only promote the evolution of economic sectors and the implementation of national strategies, but also help raise investment attractiveness of regions and address interregional differentiation issues [3].

To date, there is a whole range of classifications of RDIs based on different characteristics. In terms of the "founding principle" we can distinguish federal development institutions, federal development institutions at the regional level, and regional development institutions [4].

In international practice, the following RDIs are distinguished according to their functional features: *financial* that are responsible for additional financing of the regional financial market, *infrastructure-related* that deal with the implementation of regional infrastructure projects, *industrial (innovative) development corporations* whose goals are to support the industry in regions and promote innovation, *expansionist development institutions* that attract foreign investment and promote exports to ensure internationalization of regions, and specialized *social funds* involved in the development of territories [3].

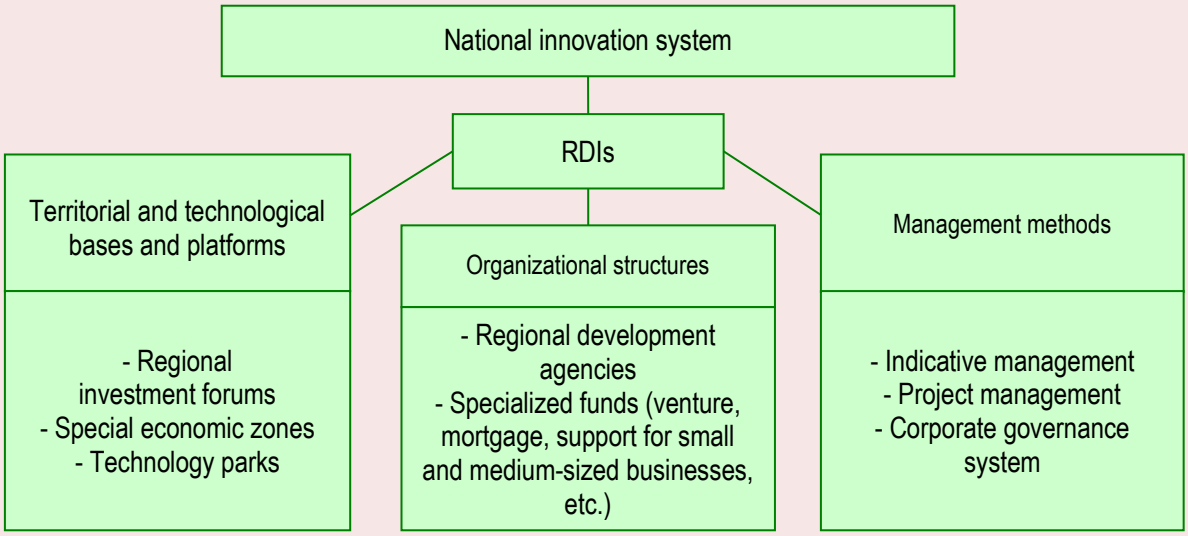
According to the level of development and maturity of RDIs, there are *competitive market institutions* (CMIs) and *catch-up development institutions* (CUDIs) [1]. The first type includes institutions that provide a high quality of competitive environment and are typical of developed countries with a high level of civic culture. CUDIs are intermediate institutions and serve as drivers of rapid economic growth in developing countries in conditions of low quality of CMIs.

RDIs include elements such as *organizational structures*, various *methods for managing* socio-economic development of territories, and *territorial and technological platforms* and bases. The first of these three elements includes regional development agencies (corporations), regional mortgage and venture funds. The second one includes corporate management system, indicative planning, project management, etc. The third one includes regional investment forums (RIF), technology parks and special economic zones. The unifying feature of different RDIs is that they are all *special institutions* (rules for the interaction of market participants) created to accelerate economic development in *individual regions* of the country. The general outline of RDIs, which does not claim to be exhaustive, is shown in *Figure 1.*

Some of the abovementioned elements of RDIs are found more commonly in catch-up development institutions, due to this fact they have not been given due attention in the Western literature. In particular, we are talking about regional investment forums that have become widespread in Russia in recent decades. These structures are unique platforms where the demand for investment and its supply can easily meet from time to time. In developed countries, this mission is performed by financial institutions and stock exchange mechanisms; but as for developing countries, these institutions are not sufficiently mature there, leading to the necessity of searching for new forms of organizing the RIF-type investment market [5; 6].

We cannot say that such forums are a unique Russian innovation; similar events are regularly held in other countries, as well. For example, in

Figure 1. General outline of regional development institutions



2020, a number of similar events were planned: the Global Investment Forum in Switzerland, the Alternative Investment Forum in Lithuania, the Responsible Investment Forum in the UK, the Selectusa Investment Summit in the U.S., the Private investment Forum Worldwide in Switzerland, etc. Russia did not just join the new institution, but became one of its first and most active operators.

To date, both positive and negative experience of RIF[2] activities in Russia has been noted. Thus, the most successful is the Saint Petersburg International Economic Forum, which since 2006 has been held under the patronage and with the personal participation of the President of the Russian Federation. According to the results of 2019, more than 19 thousand people from 145 countries attended the forum, more than 230 business events were held, and 745 investment agreements were signed for a total of 3.3 trillion rubles[3].

The success of RIF depends on many factors, including the support of federal and regional authorities, financial assistance from sponsors, coordination of dates, etc., this is why the "failure" of at least one of them can lead the forum to a fiasco. In Russia, examples of such unsuccessful initiatives include the Baikal Economic Forum, which was replaced by a more active Eastern Economic Forum, and the Tula Economic Forum held in 2006 and 2007. According to the results of the work of the Tula Economic Forum, 69 investment agreements were signed for a total of 275 billion rubles, which significantly exceeded the budget of the Tula Oblast for several years [7]; nevertheless, the forum ceased to exist in 2013 due to a decrease in investor activity [8]. However, these examples are not unique and are not typical only of Russia. For example, at the end of the past century, the government of the Republic of Bangladesh tried to attract foreign investment in the economy through investment forums and the attempts proved unsuccessful, because the exceedingly ambitious goals of the planned events and their extensive agendas raised distrust in investors and became the reasons why the initiative failed [9].

[2] In order to avoid misunderstandings we note that the concept of "RIF" is quite broad and often includes forums with other names; other forms of RIF include exhibitions, shows, etc. held on a regular basis. A more detailed discussion of these institutions is a subject of a separate paper.

[3] Saint Petersburg International Economic Forum. Available at: https://forumspb.com/about/?lang=ru

Another element of RDIs is *indicative planning* (IP). In the context of insufficiently developed institutional environment and a low level of culture and technology, IP is an institution that becomes the main driver of national economic modernization and promotes the improvement of competitive market institutions [1; 10].

The modern indicative planning system consists in the activity of state bodies aimed at drawing up medium- and long-term plans for the country's territorial and industry-specific development; the plans are based on large-scale projects for modernizing its individual regions and industries [11]. IP was widely used in the post-war period in Japan, France, South Korea, and the United States; today, it is successfully used in Ireland, India, Saudi Arabia, Malaysia and China, where it carries out macroeconomic planning while maintaining the independence of enterprises and the dominance of the public sector in the economy [1; 11; 12]. The use of IP in the Republic of Tatarstan allowed the region to become one of the leading Russian regions in terms of economic development and investment attractiveness [13; 14].

It should be noted that the RDI management institutions provide methodological support for planned projects. For example, a set of analytical tools that helps adequately evaluate comprehensive projects for the purpose of their subsequent selection and preparation of regional development plans is one of relevant issues in this regard. However, it is a topic for a separate study and lies beyond the scope of our present paper.

The types of RDIs considered above are widely distributed in both developed and developing countries. In our opinion, *project management* (PM) and *regional development agencies* (RDAs) are the most interesting and important ones among them; thus, we shall study them in more detail. We have chosen these institutions, because they are different, but complement each other at the same time. While the former are aimed at implementing *super-large-scale* initiatives that can become growth points in a particular region, the latter are designed to build a *business network* in a region so as to promote the stability of the positive growth impulses that have emerged. At the same time, here and further, we shall consider the term "region" in a broad sense, i.e. as a certain part of a country's territory that has sufficient administrative and economic independence.

Project management as an institution of regional development

Project management emerged in the 1960s and became widespread at the end of the past century. It replaced the then popular New Public Management concept, because it had its shortcomings such as an inefficient combination of process activity with program-target planning [15]; besides, it advocated the prevalence of economic efficiency over social justice and morality, thus conflicting with the principles of democracy [16].

The management model named Good Governance was designed to eliminate those shortcomings and become not only the best option for organizing public administration, but also the main factor in alleviating poverty [17; 18]. It marked the beginning of the use of program-target approach in various spheres, in particular in the Russian budget sector reform [19], in the framework of which the PM principle that considers the state program as a system of projects aimed at its implementation has become widespread[4] [20].

Since then, the interest in PM has been continuously increasing among both managers and researchers. Thus, according to the

[4] It is worth mentioning that project management is not only a tool for implementing the *Good Governance* concept, but also the *New Public Management* concept. However, PM has become more widespread within the framework of the former.

Table 1. Number of scientific articles in journals registered in the ScienceDirect database in 1996–2019, units

Year	Number	Year	Number	Year	Number	Year	Number
2019	1649	2013	1239	2007	607	2001	350
2018	1451	2012	1012	2006	562	2000	353
2017	1517	2011	858	2005	506	1999	349
2016	1532	2010	685	2004	429	1998	372
2015	1630	2009	675	2003	412	1997	350
2014	1491	2008	640	2002	364	1996	438

Compiled with the use of ScienceDirect data.

ScienceDirect database, which is owned by Elsevier, one of the world's largest publishing houses, and which contains about 2.5 thousand scientific publications and 26 thousand e-books[5], the number of articles in scientific journals that are more or less related to *project management* was 19.5 thousand, while their annual number increased 3.8-fold in the period from 1996 to 2019 *(Tab. 1)*. The total number of articles devoted to this topic in all sources contained in ScienceDirect (books, abstracts, encyclopedias, reports, etc.) for the period under consideration is 36.1 thousand.

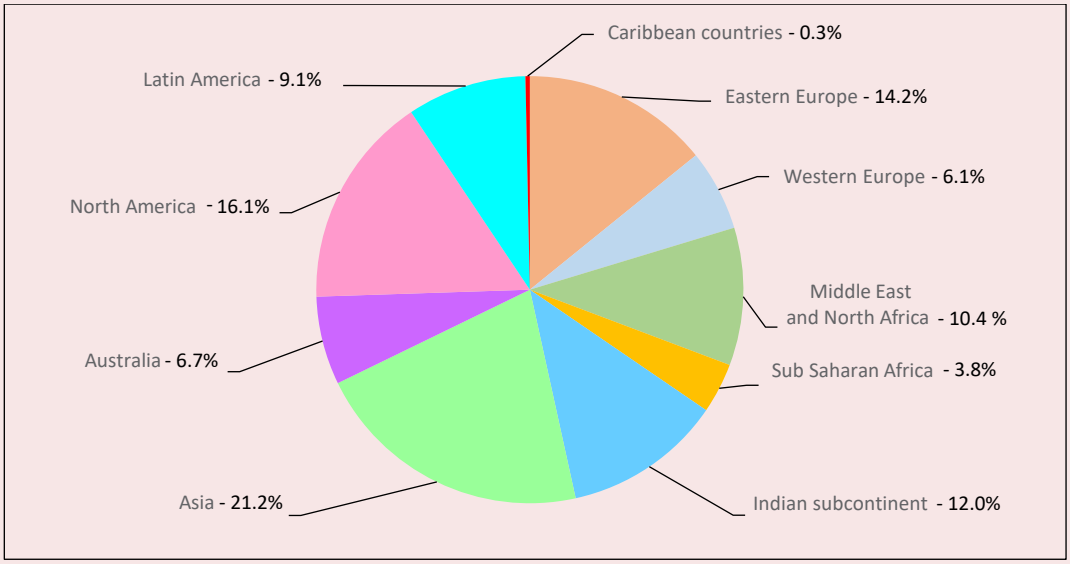
The subject matter of scientific research in the years under consideration has also undergone significant changes. Thus, at the initial stage, the study of theoretical aspects of PM prevailed: relationship between the project and project management [21]; combination of a wide range of modern projects and various management styles [22]; possibilities of using PM in various fields such as medicine [23], designing production systems [24], entertainment industry [25], etc.; implementation of modern concepts and methods of project management in different countries, such as China [26], Russia [27], etc.

More recent studies have focused on empirical research, such as the results of the use of PM standards at German and Swiss enterprises [28] or the experience of its implementation in 30 metalworking companies in Portugal [29], as well as the identification of criteria for best management practices based on the performance of company managers [30]. Comparative analysis of PM implementation has been developed in various industries [31; 32] and in countries with different mentalities and cultures [33; 34]. Modern research in the field of PM is devoted to the effectiveness of its tools and its impact on territorial socio-economic development.

Project financing (PF) is recognized as one of the most effective tools in project management. The term has no unambiguous definition yet. According to some authors, the essence of PF is most fully revealed in a definition provided by the Basel Committee on Banking Supervision which operates under the Bank for International Settlements. According to the definition, PF should be understood as a special way to attract funds for a specific long-term investment project (usually large, complex and expensive one) secured by future cash flows from its implementation [35; 36]. Others consider PF as "a multi-tool financing scheme, designed specifically for the implementation of a company's project, and the future cash flows of the project under this scheme will be the main source for ensuring repayment of borrowed funds and payment of income to investors" [37, p. 55]. Still others perceive PF as "a way to attract long-term credit financing for large projects through "financial engineering" based on borrowing for the cash flow generated only by the project itself" [38, p. 14].

[5] Official website of ScienceDirect. Available at: https://www.sciencedirect.com/

Figure 2. Regional distribution of the global PF market, %



Source: Project Finance Report, 2018.

Despite the variety of definitions found in scientific literature, the examples given above prove that they are all essentially identical and reflect the following main features of PF: it is implemented for a particular project, usually a new one; it is characterized by high risks due to the lack of assets to secure the repayment of borrowed funds; a future cash flow from the project acts as a guarantee of return of the funds.

The modern practice of PF originated in the 1930s with the financing of oil exploration in the U.S. [39], but it became widespread at the end of the 20th century – first in major American energy projects and then in the field of public infrastructure in the UK and mobile phone communications around the world [38]. In 22 years (from 1991 to 2012), the U.S. allocated more than 2.5 trillion US dollars to finance about 6 thousand international projects [40]. In 2008, there began a vigorous redistribution of projects toward the Asian subcontinent [39]. Consequently, at the beginning of 2018, Asia became one of the leaders in the global PF market *(Fig. 2)*. In general, the global volume of PF at the end of 2017 amounted to 338.5 billion US dollars[6].

Today, PF is viewed as a high-quality financial instrument that enables better investment management and economic growth. For example, the positive impact of PM on socio-economic development in European countries is shown with the help of econometric models [41]. In turn, the analysis of 90 countries for the period from 1991 to 2005 using the neoclassical growth model has shown that the strongest effect of PF is observed in low-income countries, which, according to the study [42], can receive up to 0.67% of annual GDP growth if their project financing level increases from the 25th percentile of the sample to the 75th.

In Russia, the interest in PF, which has not yet become a widely used tool, is increasing continuously. In particular, this can be seen in the growing number of publications devoted to this topic. Thus, according to the electronic library eLIBRARY.RU, the number of articles

[6] *Project Finance Report, 2018.* Available at: https://www.iflr.com/Supplement/98839/Supplements/Project-Finance-Report-2018.html

on PF in scientific journals increased 87.5-fold from 2000 to 2019: from 2 to 175, respectively. Their total number for the specified period was 1.2 thousand. Despite a fairly modest amount of works that analyze the empirical experience of implementing PF in Russia and its relationship to economic growth and development of territories, the available publications can help us point out the most promising areas of its application. These include construction, infrastructure, and the fuel and energy complex.

Many studies have noted that despite Russia's participation in major international projects such as Sakhalin-2, Yamal-LNG, Nord Stream, and others, its PF is in the state of stagnation due to a variety of reasons, mainly the insufficiency and fragmentation of the legislative base in the sphere [37], Russia's general macroeconomic situation flawed by elements of slackness and investment stagnation [43]; declarative governmental decisions in the field of project activities taken in 2014-2016 [13].

Global PM practice has already proven its worth (it is enough to recall such large-scale projects as the Suez Canal, the Sydney Opera House, the Concorde supersonic airliner, etc.), but there still remain certain questions concerning the effectiveness of the projects. For example, the opening of the famous opera house in Sydney undoubtedly influenced the city's further development. Being one of the landmarks of Australia, the theater is annually visited by about two million people, and an infinite number of tourists take a selfie in front of it. However, this super-successful project was close to complete failure at the stage of its implementation: its construction timing was delayed by 14 years instead of the planned four years, and the cost sheet exceeded the planned one by almost 15 times[7].

Another example is the famous Olympic stadium in Montreal ™ an amazing architectural structure that is still not only one of the largest sports venues in Canada, but also the main attraction of Montreal. Its 175i meter tower, tilted at an angle of 45 degrees, offers an extraordinary view of the surrounding area, which can be admired after getting via the funicular to the observation platform located on the top of the tower. However, the famous Canadian stadium is also one of the most disastrous projects: its construction, which was planned to be completed in 1972, stretched for almost 20 years, and the original estimate of 134 million US dollars at the time of opening the stadium in an incomplete form to host the 1976 Olympics was exceeded by 8.2 times, thus creating a large hole in the city's budget for 30 years [44]. The total cost, including the subsequent construction and reconstruction of the stadium, was 1.4 billion US dollars[8].

These cases are not unique: cost overruns in the construction of the Concorde supersonic airliner amounted to 1,100%, the Suez Canal – 1,900%, the Hubble Telescope – 525%, the Humber Bridge in the UK – 175%, etc.[9] The projects that have changed the course of world history in the long term can be viewed as a clear example of ineffective management at the stage of their planning and implementation[10].

All this makes it possible to conclude that PM is a labor-intensive process, associated with high risks and complexity of the tasks at hand.

[7] Sydney Opera House. Available at: https://www.miroworld.ru/sidnejskij-opernyj-teatr/.

[8] In Depth: World's Most Expensive Stadium. Available at: https://www.forbes.com/2008/08/06/expensive-stadiums-worldwide-forbeslife-cx_ae_0806sports_slide.html#310a4a111ead

[9] Project management as a way to implement strategic objectives. Available at: https://www.youtube.com/watch?v=wJd-4e1eFXM

[10] The examples show that the contradiction in their success is related to the methodological issues of assessing the economic effect. Obviously, these unique events and objects have a positive effect in the long-term project, and negative – in the short-term project. We proceed from the prerogative of long-term development.

However, this practice makes it possible to achieve economic breakthrough and bring countries to a new level of development. The experience of "economic miracle" countries (China, Vietnam, Malaysia, etc.) confirms that the breakthrough effect is possible only through the implementation of *megaprojects* that contribute to the technological breakthrough and acceleration of economic growth. Catch-up development institutions play a key role in enabling such a breakthrough, as noted earlier [1; 10].

There are reasons to believe that the reform of the state system of project activities carried out in Russia in 2018-2019 may become a significant step toward the formation of similar institutions in our country [13]. In particular, in 2018, the Government of the Russian Federation issued Resolution No. 158 dated February 15, 2018 "On the Project Finance Factory program", which defines the mechanism for financing investment projects in order to ensure economic growth and increase the availability of this tool in Russia. The Ministry of Economic Development of the Russian Federation is the chief curator of the Project Finance Factory, Vnesheconombank (VEB) is the operator, acting not only as an accumulator of state guarantees and subsidies received from the Ministry of Finance of the Russian Federation, but also as an expert in the selection of investment projects for participation in the program. The launched mechanism actually reconfigures the architecture of PM in Russia, contributing to the transformation of the state from an ordinary participant into an actual driver of PF [43] and thereby contributing to its becoming a key tool for the implementation of national projects [13; 45].

Regional development agencies: opportunities and risks

According to the European Association of Development Agencies (EURADA), Regional development agencies are public-private legal entities, established between the national and the local level, with the intention of working through different channels with private companies, public institutions, and civil society towards the attainment of improved economic development[11].

The legal status of RDAs differs in almost all European countries. RDAs are semi-autonomous public corporations in Germany, public-private sector corporations in the Czech Republic, Estonia, Slovakia and Poland, inter-municipal agencies in Spain, private legal non-governmental organizations in France, public limited liability companies in the Netherlands, Italy, Ireland and Portugal, non-departmental non-governmental organizations in the UK, limited liability companies in Sweden, non-profit organizations in Latvia, municipal enterprises in Greece [46].

Despite the fact that the organizational and legal models of RDAs are as diverse as the countries to which they belong, modern researchers identify a number of specific criteria for a typical RDA, as well as environmental factors crucial to the success of its activities in the region. The specific criteria include the following: the agency's semi-autonomous position in relation to central authorities, strategic support provided to local firms through soft policy tools, and comprehensive support using a wide range of policy tools [47]. The success factors include a fairly large population, the region's entrepreneurial potential, skilled labor force, and a consensus on a local/regional development strategy [48].

The progenitor of modern RDAs is considered to be the *Tennessee Valley Authority* created in the U.S. in 1933 to address issues related to the economic development of the Tennessee Valley, the region most affected by the Great Depression [49]. The establishment

[11] *EURADA*. Available at: http://www.eurada.org/studies-of-rdas/

of the Authority actually determined the main goal of all subsequent RDA activities – to contribute to the socio-economic development of a particular territory. Despite the overall goal of RDAs, the tasks to achieve it varied depending on the political and economic goals of the state and the specifics of the time in which they were developed. In this regard, we will consider three types of RDAs, which differ in functional characteristics.

1. RDAs to ensure regional leveling within the country. This type includes RDAs that address issues of development of a separate territory and regional leveling within the country. The history of their formation dates back to the 1960s and 1970s, when the regional administration of Western Europe began to change due to the transition from the traditional "top-down" policy to the "bottom-up" policy and the increasing role of agencies that are not part of the government machinery. Traditional policies based on the attempts of the central government to promote equality between regions by increasing the economic activity of underperforming areas using the "carrot and stick" method and relying on "hard" tools such as infrastructure development and financial subsidies, did not allow achieving the intended goals, and one of the reasons was the lack of understanding of the specific features of a particular territory.

The new model of regional policy coming from the regions themselves (from the bottom up), was aimed at developing and improving the competitiveness of local firms and was implemented using "soft" tools, such as personnel training and consulting. To implement this kind of policy, regions needed some structures on site; the structures had a certain degree of independence from the central government and could act as an *intermediary* between the region and the government: on the one hand they transferred the interests of the region "upward", on the other hand they served as a conductor of funds allocated "from above" for the development of the territory. The role of such structures was performed by RDAs created at that time, and their primary task was to level the development of regions within the country [50; 51].

The process of creating RDAs during that period extended not only to European countries such as the Netherlands, Austria, Denmark, and Scotland [51; 52], but also to other developed countries. For example, in Australia, RDAs were implemented in the form of non-governmental land agencies, they aimed to develop regions by selling land to governmental structures and participating directly in housing construction; in Canada, the Department of Regional Economic Expansion was formed, which after a series of mergers and transformations was reformed into the Canada Economic Development for Quebec Regions in 2005 [53; 54].

Studies of that period show that most of RDAs were focused not so much on increasing the investment attractiveness of the region, as on strengthening the competitiveness of local firms and addressing employment issues in a particular territory [47]. However, over time, their activities shifted toward promoting the region as a point for the inflow of investment in the modernization of production and the development of high-tech industries.

For example, the first RDA in Scotland, the Highlands and Islands Development Board, was established in 1965. One of its tasks was to distribute state subsidies for the economic and cultural development of the sparsely populated northwestern territory of the country. In 1975, a similar body was formed for the lowlands of Scotland – the Scottish Development Agency (SDA), headed by an independent board and funded by the Scottish Office of the UK

Department of Trade and Industry. SDA was initially focused on supporting local firms by providing capital and restructuring traditional industry sectors. Up to 75% of all investment was made in traditional Scottish industries (engineering, textiles, food processing, etc.). This policy effectively addressed the challenges of maintaining regional employment, but did little to promote progressive sectoral changes in the economy. In this regard, in the early 1980s, there was a revision of SDA's strategy toward a venture approach focused on new high-tech firms; this measure led to the redistribution of investment in advanced industries (electronics, biotechnology, etc.) from 25 to 50%. In addition, against the background of a general decline in the number of firms invested, the targeting of investments increased, SDA offices were established abroad to attract foreign capital, and there was a noticeable increase in consulting services (by almost 700% during the 1980s), especially in areas such as technology transfer and market intelligence [52].

In 1991, both organizations were transformed into non-departmental non-governmental entities funded by the Scottish government: Highlands and Islands Enterprise (HIE) and Scottish Enterprise (SE), respectively, which together with the Scottish Development International (SDI) represent the modern RDA system in Scotland. Each structure oversees a specific region of Scotland: HIE – the North-West; SE – the Central, Southern and Eastern parts. SDI represents Scotland on the international market through an extensive network of representative offices in more than 20 countries.

According to HIE performance results in 2018-2019, 564 projects were supported for a total of 54.6 million pounds; as a result, more than 1,000 jobs were created, trade between supported enterprises increased by almost 118 million pounds, and international trade – by 46 million pounds per year[12]. The number of projects supported by SE over the same period was 69 for a total of 24.5 million pounds, of which the share of small and medium-sized enterprises in the region was 17.9 million[13]. In addition, SDI signed a number of strategic agreements with foreign investors and modern manufacturers; thus, new prospects in the development of high-tech industries opened up for the country. For example, a Strategic Alliance was signed with Boeing UK to develop and promote the supply chain of modern aircraft components, contributing to the creation of 200 new jobs in Scotland. One of the initial areas of work of the Alliance was to invest 11.8 million pounds in a project to develop an ultralight metal base for aircraft components, the project was implemented by a research center at the University of Strathclyde. In addition, contracts were signed with the U.S. cloud technology company Elcom Systems Limited that specializes in electronic procurement, the contracts aimed to expand the company's activities in Glasgow; contracts were also signed with the U.S. space-to-cloud data and analytics company Spire with the goal of opening a new office in Scotland; these activities will not only promote the creation of new jobs in Scotland, but also enable the country to become a leader in research in the field of meteorology[14].

This innovative strategy contributes to the modernization of Scottish industry and its diversification associated with the transition to a high-tech economy and the development of industries such as the electrical industry, energy, and innovation technologies.

[12] Official website of HIE. Available at: https://www.hie.co.uk/media/5488/hieplusannualplusreportplusandplusaccountsplus2018-19.pdf

[13] Official website of SE. Available at: https://www.scottish-enterprise.com/media/3222/rsa-annual-summary-2018-19.pdf

[14] Official website of SDI. Available at: https://www.sdi.co.uk/news-features/news-and-feature-articles

2. RDAs that provide economic leveling within an international association of countries. The second type of RDAs is agencies whose goal is to address regional differentiation between countries within the European Union. They emerged at the end of the 20th century, when the EU was being formed. In the transition to a market economy after the 1991 events many potential EU member states mainly in Central and Eastern Europe (CEE) faced a problem of considerable regional imbalances, and finding a solution to this problem was complicated by the lack of a clearly defined regional development policy and was considered within the framework of various macroeconomic strategies. By requiring EU candidate countries to create decentralized regional organizations that increase the territory's potential and help reduce the differences between the level of development of EU member states, the European Commission actually motivated these states to adopt regional development policies within the framework of existing EU regulations and initiated the process of establishing RDAs on the territory of CEE [55]. In turn, the European Association of Development Agencies (EURADA), which was established in 1992 and which currently unites 76 RDAs from 22 EU countries, promoted the dissemination of best practices in regional economic development for the benefit of the entire European community and actively participated in the creation of agencies in CEE countries. In the 1990s, EU specialists established RDAs in Hungary, the Czech Republic, Poland, Slovakia, Estonia, Lithuania and other CEE countries [56].

Despite the fact that this group includes mainly RDAs from CEE countries, in which RDAs were founded due to the desire of these countries to join the EU, the group can also include EU member states, where RDAs have also played a significant role in alignment between nations. Portugal provides a telling example in this regard: the first RDA appeared there only in 1999. Created initially for the purpose of leveling regional imbalances within the country, they quickly shifted toward catch-up development within the EU [57]. This gave a certain impetus to the country's economic development, placing it on the 4th position among the OECD countries in terms of per capita GDP growth in the late 1990s and early 2000s. Thus, the ratio of Portugal's per capita GDP to the European average increased from 73 to 77% over the period from 1998 to 2002 against the background of a rapid growth in this indicator in the Lisbon Region (from 95 to 105%) and in Madeira (from 58 to 90%)[15]. However, in the following years, GDP growth in Portugal experienced a pronounced slowdown; there was an annual decline in local and regional investment by an average of 1.4%, against the background of average European growth of 2.9% per year; intraregional differentiation has increased [58]. Modern Portuguese RDAs that are regulated as private legal entities implement regional policy according to the principles established by the central government, so the entire Portuguese RDA system can be described as predominantly centralized[16]. Although this policy contributes to regional leveling within the country, it does not allow Portugal to reduce the gap with advanced EU states: over the past years, the ratio of Portugal s per capita GDP to the average European one has remained at 77%[17].

Over time, the process of establishing the RDA system in CEE countries, which initially contributed to their accession to the EU, has become an effective tool for the central government to implement regional strategies in many countries.

[15] Eurostat data.

[16] *EURADA*. Available at: http://www.eurada.org/wp-content/uploads/2020/04/RDAs-Portugal-Study.pdf

[17] Eurostat data.

Thus, in Poland, RDAs began to be established at a rapid pace in 1991, when the first six such agencies appeared. During 1991i 1997, 33 RDAs were established, as well as more than 100 business support organizations (specialized funds, associations). They are essentially analogous to RDAs, but unlike RDAs they do not represent the authorities. Initially created to restructure unprofitable state-owned enterprises and support regions within the country, RDAs quickly turned into an instrument of international leveling. Today, RDAs in Poland are actively involved in the implementation of not only regional, but also innovation policy; this has helped reduce the country's lagging behind the average European level in gross GDP from 46% in 2000-2002 to 71% in 2018[18].

Romania provides another example of sufficiently effective integration of RDAs into the national innovation system [59]. Its accession to the list of candidate countries for EU membership in 1995 helped distinguish regional development policy from the general socio-economic course and make it an independent direction. The Green Carte of Regional Development created in 1997 marked the beginning of further actions to define the institutional and legislative framework in the field of regional policy, the final consolidation of which took place in 1998 with the adoption of a law on regional development[19] [49]. According to this document, the policy aimed to ensure balanced and sustainable economic growth and reduce regional disparities between individual regions, both within the country and between Romania and EU member states, should be implemented in specific regions through central government bodies and specialized regional bodies with the involvement of business partners. In the period from September 1998 to May 1999, Romania was divided into eight development regions; they were named on a geographical basis and did not receive an administrative status. The territorial division was introduced solely to improve the coordination of regional development projects and the management of funds received from the EU[20].

The current institutional framework for regional policy in Romania includes both the *national* level represented by the Ministry of Regional Development and Public Administration and the National Council for Regional Development, and the *regional* level, which includes RDAs and regional development councils. The National Council for Regional Development participates in the development of a national strategy for regional development, considers criteria and priorities for the use of the National Fund for Regional Development, and takes part in the approval of projects proposed by RDAs. Eight regional councils, which are voluntary associations of local governments without forming a legal entity, perform similar functions at the regional level [49].

Regional policy at the local level in Romania is carried out by RDAs, which are non-profit organizations that have a legal status (unlike councils) and operate within their own budget. Their tasks are to design development plans for their region in accordance with national strategies and distribute funds for specific regional projects from the budget that is financed from various sources: the National Fund for Regional Development, regional budgets, foreign investment, private sector funds, etc. [46].

The effectiveness of regional policy in Romania can be assessed on the basis of per capita GDP. Taking into account the fact that

[18] Eurostat data.

[19] Law No. 151/1998, *Privind dezvoltarea regională în România*. Available at: http://legislatie.just.ro/Public/DetaliiDocument/15220

[20] Regional Development Agencies in Romania. Available at: http://www.eurada.org/wp-content/uploads/2020/04/RDAs-in-Romania.pdf

Table 2. GDP per capita in the regions of Romania by PPP

Development region	2004		2006		2018	
	GDP per capita, PPP, EUR	GDP per capita, % of EU average	GDP per capita, PPP, EUR	GDP per capita, % of EU average	GDP per capita, PPP, EUR	GDP per capita, PPP, % of EU average
North-West (Nord-Vest)	7 093	33.0	8 500	35.9	18 500	61.0
Center (Centru)	7 629	35.5	9 100	38.3	18 800	62.0
North-East (Nord-Est)	5 070	23.6	5 800	24.7	12 600	42.0
South-East (Sud-Est)	6 612	30.7	7 700	32.5	16 500	55.0
South - Muntenia (Sud – Muntenia)	6 111	28.4	7 600	32.1	15 400	51.0
Bucharest - Ilfov (Bucuresti – Ilfov)	13 862	64.5	19 800	83.8	45 900	152.0
South-West Oltenia (Sud-Vest Oltenia)	6 183	28.8	7 200	30.4	14 900	50.0
West (Vest)	8 395	39.0	10 600	44.7	20 500	78.0
Romania	7 301	34.0	9 100	38.4	19 900	66.0
EU	21 503	100.0	23 600	100.0	30 200	100.0
Compiled with the use of Eurostat data.						

the main task of RDAs is to promote social and economic development of the territory, we can say that the growth of per capita GDP directly correlates with their activities [60]. *Table 2* provides data on per capita GDP to assess the success of Romania's integration into the EU.

We can note a positive trend in leveling off regional disparities between Romania and the EU countries. At the time of joining the EU in 2007, Romania's per capita GDP was 38.4% of the European average, which is by 4.4 percentage points higher than two years earlier. At the same time, in the most developed region of the country (Bucharest-Ilfov), its value reached 83.8% of the EU level. Positive dynamics continued in the following years: despite the fact that Romania's per capita GDP lagged considerably behind the EU average (66.0%) in 2018, its growth rate for the period under consideration was almost twice higher than the European average: 2.73% versus 1.40.

However, the implementation of a new regional policy in Romania has also revealed an unforeseen problem: along with the reduction in intergovernmental disparities in comparison with the EU member states, there has been an increase in economic and social inequality between regions within the country. Thus, the gap between the most developed region (Bucharest-Ilfov) and the least developed one (North-East) increased from 2.7 to 3.6 times. A similar increase in the gap between the center and the regions is observed in the rest of Romania; this allows us to conclude that the country is forming a *concentric model of development* under which the main resources are concentrated in a strictly limited area [61]. All of this suggests that although RDAs in Romania are an effective tool for equalizing disparities between nations, RDA activities require some adjustment in relation to the policy within the country in order to reduce the gap between regions. However, they will continue playing a crucial role in the economic development of regions and in the policy of regional decentralization, because the country's economy depends on EU policy and its financial support.

3. RDAs that help the country join the world's leading nations on the basis of the innovative economy. The third type of RDAs includes agencies that are one of the most effective tools in the CUDI system; they are used by almost all of the "economic miracle" countries (China, Malaysia, Vietnam, Botswana, etc.). As a rule, such agencies are general development agencies (GDAs) which coordinate the activities of all other elements of the CUDI system in the country [1; 10]. In most cases, GDA is a federal governmental structure responsible for national innovative development, taking into account the regional factor. For example, in China, GDA is represented by the National Development and Reform Commission which is responsible for designing long-, medium- and short-term development plans for the country at all levels, for their consistency with budgets and for coordinating the work of the national innovation system. In Malaysia, GDA is represented by the *Economic Planning Unit*; in Botswana – the Ministry of Finance and Development Planning, etc. [10]

The contribution of RDAs to rapid development of the abovementioned countries is determined by the role the agencies perform in the implementation of large-scale megaprojects to upgrade the economy, catch up with developed countries and achieve an "economic miracle". RDAs help build trust between interacting agents, enhance the effectiveness of their interaction and thus help achieve their goals by coordinating the activities of all participants in the process of implementing a megaproject, starting with its selection by ministries and ending with the involvement of representatives of business structures and civil society in its implementation [13].

Thus, the study of practical experience in the functioning of RDAs has shown that although this tool is effective for leveling disparities both at the national level and in the cross-country context, it can contribute to the formation of a *concentric development model* in the country, when the main resources are concentrated in a strictly limited area.

In Russian scientific works, the practice of functioning of RDAs that are represented mainly in the form of regional development corporations (RDCs) has not yet become widespread due to their novelty and the insufficiency of their analytical framework. Thus, their history dates back to 2005, when the Far East Development Corporation was established. Despite the fact that RDCs should act as drivers of regional development, one cannot say they are implementing this mission quite successfully and in full. Some RDCs such as the Eastern Yakutia Development Corporation, the Republic of Buryatia Development Corporation, and the Republic of Tatarstan Development Corporation didn't last even five years and were shut down. There are various reasons for the failures, ranging from the curtailment of investment projects, for which RDCs were created (for example, the project "Integrated Development of Tomponsky Mining District" in Yakutia), to the lack of a full exchange of information with the external environment, which generates managerial malpractices and inhibits regional initiatives [62].

However, there are also positive cases when RDCs successfully implement investment projects in their regions so as to contri ute to the development of the sectors and areas that are considered to be of high priority by the constituent entity of the Russian Federation. For example, the Development Corporation of Bashkortostan Republic (DCBR) is successfully engaged in investment projects in agriculture, petrochemicals, forestry, logistics, and tourism. With the participation of DCBR, large-scale projects have been implemented or are currently

being implemented throughout the region. Such projects include the construction of a mining plant in the territory of Abzelilovsky District, a new chemical enterprise the Cosmetic and Textile-Processing Chemicals Plant in the city of Blagoveshchensk, "Ufimsky" Industrial Park, production of satinite in the town of Kumertau, modernization of the production of mechanization means and tools for installation of power lines, cable networks etc. The contribution of these projects alone to the region's economy amounts to 2.12 billion rubles of investment with the creation of 424 additional jobs[21].

The experience of Russian RDAs has yet to be understood, and key factors for their success and reasons for failures are to be revealed. However, when working to expand and improve RDAs in Russia, one should take into account the foreign experience discussed in this paper.

Conclusion

The analysis of global practice has shown that powerful RDIs such as PM and the system of RDAs has already been created and tested. These institutions, when used effectively, can completely transform the economic landscape of cities and regions in many countries. Russia has already started introducing these institutions into practice, but so far neither PM nor RDAs are able to cope with their mission as drivers of the regional economy. However, there is reason to believe that these institutional initiatives will be expanded and improved in the future. For this purpose, the organizational and methodological experience of those countries that have been able to create effective RDIs can be useful.

Among other things, international experience shows that both PM and RDAs are not a cure-all for regional stagnation. Actually we are talking about the fact that their effective use involves considerable managerial skill. For example, many sites and facilities built with the use of PM, even in the case of a large long-term economic effect, have problems related to manifold underestimation of the amount of funding and the timing of implementation. As for RDAs, they are heterogeneous and functionally different: some are aimed at intraregional leveling, others – at reducing cross-national disparities, others – at catch-up development and building an advanced economy. Of course, this division is conditional, because each RDA, as a rule, addresses all three types of problems. However, their certain specialization is still clearly visible; moreover, these tasks can come into conflict and cause negative side effects. Thus, the concentration of resources on the most promising limited territory can lead to the formation of a concentric model of development and to the growth of interregional disparities within the country. On the contrary, reallocation of funds to level up the underperforming regions can reduce the overall effectiveness of the national economy. There are also cases when addressing problems to boost regional growth contributes to the preservation of traditional industries and hinders the introduction of more modern types of business and related innovations.

The accumulated global experience in the emergence of issues and addressing them in the implementation of promising RDIs creates an information base for Russian operators and minimizes management errors.

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Regional Tax Gap and Assessment of Its Determining Factors*

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Abstract. Reduction of the tax gap at the regional level contributes to development of tax potential and the increase of regions' budget security. The purpose of the article is to study the tax gap at the regional level in the Russian Federation (RF) on the basis of a comprehensive assessment of factors that determine it. Approaches to the determination of the tax gap at regional and national levels are summarized. Factors that form the tax gap are defined. Due to the purpose of the study, it includes the amount of taxes and fees' arrears, the amount of additional taxes and fees in case of tax inspections' continuous coverage of taxpayers, and the scale of the shadow economy. The developed methodology for analyzing the structure and dynamics of regional tax gap factors is presented. It allows assessing its size, structure, and the work quality of region's tax and financial authorities. Besides, it allows identifying opportunities for reducing the tax gap. A variant of grouping entities of the Federation regarding the state and prospects of reducing the tax gap, formed on the basis of the ratio of its level and dynamics, is proposed. Grouping of regions helps to conduct its comparative analysis according to the tax gap and its determining factors. The potential for reducing the tax gap in Russia by improving the quality of tax administration has been largely implemented. The work with tax arrears opens up opportunities for financial and tax authorities. The shadow economy has the largest share in the tax gap, which actualizes the importance of conducting the comprehensive work of the state to legalize it.

Key words*:* tax gap, tax competition, tax potential of the region, factors of the tax gap, tax arrears, shadow economy, tax control.

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Introduction

Development of regions' tax potential is necessary for smoothing spatial differentiation [1, p. 58–59], aligning budget security, and fulfilling the state's announced contribution to economic development within slowing growth rates in Russia when the real GDP growth rate has not been exceeding 1–2% since 2013 (in case of 2015 recession)[1]. It is possible, first, through expanding the tax base without increasing the tax burden. For example, by activating tax competition of regions for mobile tax bases or reducing the tax gap.

Tax competition for mobile tax bases implies fair competition between state authorities of entities of the federation through establishing taxes and taxation conditions, when the choice of a particular policy by each authority affects the distribution of the mobile tax base [2, p. 1]. Currently, in Russia, regional tax competition is at the stage of formation. We assume that, with the help of tax competition tools, state authorities of federation's entities try to inspire investors' interest in the region by compensating for shortcomings of the investment climate, economic and geographical location, resource base, infrastructure development, and business environment. The process of a horizontal tax competition in Russian regions requires a separate study.

The tax gap at regional and national levels is not sufficiently explored in domestic studies, and, in practice, assessments exist (in tax authorities), but it is not official despite the fact that the amount of tax gap factors is significant: tax arrears exceed 1 trillion rubles, or 8.4% of the RF consolidated budget's revenue, or 1.1% of GDP[2], and the shadow economy, according to official data, reaches 12–15% of GDP[3], according to unofficial sources – 23–44% [3, p. 9]. At the same time, for example, statistics on the tax gap have been published for decades in the EU at the state level[4]. The United States was the first country to begin measuring the number of taxpayers, who fulfill and do not fulfill tax obligations, and potential lost tax revenues back in 1963 [4, p. 121].

The purpose of the study is to fill the gap in the definition of the tax gap at the RF regional level, which exists in domestic financial science, through a comprehensive assessment of factors that form the tax gap.

Approaches to defining the tax gap and its interconnections with other categories

In modern financial science and practice, a unified approach to the definition of the tax gap has not been formed. This category is reviewed in theoretical and applied terms. Within a theoretical or scientific approach, the tax gap is understood, extremely generally, as the difference between actual tax revenues to the budget system and accrued taxes, or a potential possible level of tax revenues. In this case, the tax gap is reviewed at the macro-level, so the approach may also be called macroeconomic. At the same time, with development of methods of tax control and administration, in particular,

[1] Gross domestic product's indices of physical volume. *Federal State Statistic Service of the Russian Federation*. Available at: https://www.gks.ru/free_doc/new_site/vvp/vvp-god/tab3.htm (accessed: November 30, 2019).

[2] Data on forms of statistical tax reports. *Federal Tax Service of Russia*. Available at: http://www.nalog.ru/rn76/related_activities/statistics_and_analytics/forms/#t2 (accessed: November 30, 2019).

[3] Adjustment of gross value added of economic operations that are not observed by direct statistical methods. *Federal Tax Service of Russia*. Available at: http://gks.ru/storage/mediabank/tab14-19-2.xls (accessed: November 30, 2019).

[4] *Measuring Tax Gaps. 2015 edition. Tax Gap Estimates for 2013–14.* HM Revenue & Customs, 2015. Available at: https://www.gov.uk/government/statistics/measuring-tax-gaps (accessed: November 30, 2019).

with the introduction of SUR ASK NDS-2, the term "tax gap" became widespread in financial and economic activities. The practical approach assumes that the tax gap is interpreted as discrepancies in data on tax declarations of counterparty organizations in the same operations. In other words, the tax gap here is a sign of incorrect calculation of tax liabilities, illegal application of tax deductions with the emergence of discrepancies in the reflection of same operations by counterparties. Thus, according to the practical approach, the tax gap is reviewed at the micro-level, but it is also generally associated with the difference between paid and accrued level of tax payments.

How do researches define the tax gap? O.A. Mironova, F.F. Hanafee regard the tax gap as the difference between the sum of tax payments which could come in the budget system on the condition of full settlement of all tax legislation norms and timely transfer of taxes, on the one hand, and, on the other hand, the tax sum actually paid up in the reporting period. Scientists emphasize that this difference may occur due to deliberately hidden by taxpayers tax bases, their failure to fulfill tax obligations, the usage of illegal tax minimization schemes and, as a result, the lack of sufficient tax payments' inflow into the budget [5, p. 112].

D.Y. Shakirova and V.N. Zasko give the following definition. The tax gap is the difference between the amounts of actually received taxes and estimated amounts of tax sums that could be received by the budget system, if taxpayers fully complied with the legislation on taxes and fees [6, p. 163].

Foreign scientists Raczkowski K. and Mro'z B. define the tax gap as the difference between owing taxes that taxpayers had to pay over a certain period of time, and the amount of tax that was actually brought to the state budget [7, p. 546].

The US Chamber of Commerce gives the following interpretation. The tax gap is the difference between the amount of taxes that taxpayers should have paid and what they have actually paid voluntarily and on time[5].

The tax gap may also be reviewed within individual taxes. It is noted in the European Commission's Project group report on the tax gap that the tax gap on corporations' revenue is the difference between potential liabilities, i.e. a tax that would have been collected if all taxpayers had complied with tax laws, and actual tax payments. The corporate income tax gap may be represented as a percentage of GDP, as a percentage of potential liabilities, or as absolute values [8, p. 22].

Besides, in scientific studies, there is a common usage of the term "gap" in relation to tax management: for example, "tax gap management". In this context, it is about the management of specific imbalances natural for the tax system: between the effects of taxation on progressive and flat scales; in the sphere of foreign economic activity, depending on VAT; tax benefits; between budget revenues and expenditures; in time lags between GDP creation and generation of tax revenues [9, p. 23].

Thus, approaches to determining the tax gap are largely similar among domestic and foreign researchers. It is based on categories of taxpayers' tax liabilities and actual tax receipts. Main criteria are completeness and timely fulfillment of tax obligations. At the same time, the criterion of timeliness is not underlined in all definitions, for example, it is absent in the definition of D.Y. Shakirova and V.N. Zasko, as well as in the European Commission Project group report on the tax gap. We consider this

[5] *Tax Gap. Multiple Strategies Are Needed to Reduce Noncompliance*. United States Government Accountability Office, May 9, 2019. Available at: https://www.gao.gov/assets/700/698969.pdf (accessed: November 30, 2019).

criterion to be significant, since it is important not only to fully fulfill tax obligations but also to pay it within the time set by law.

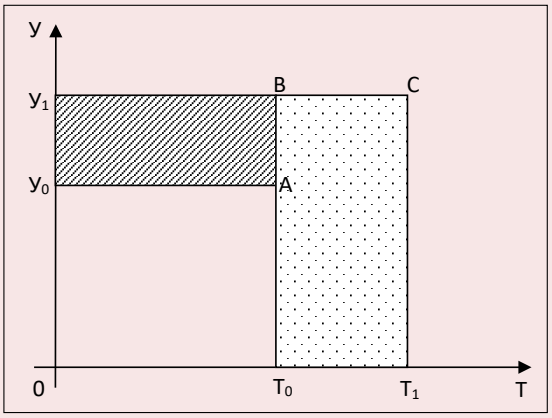
Summarizing various approaches, we believe that the tax gap may be defined as the difference between actual tax revenues and estimated ones that could replenish the budget if all taxpayers complied with the legislation. In other words, as the difference between actual tax revenues and tax potential.

It is also important to determine the interconnection between tax potential, tax gap, and tax limit categories.

We understand tax potential as the component of the structure of budget and financial potential which is the maximum amount of revenue of the budget system, potentially accumulated in the form of taxes, fees, and other mandatory payments from economic entities on a given territory within the current model of tax federalism for a certain period of time, mediated by tax authorities, in accordance with the state's tax policy and considering the level of economic development[6].

Tax potential is not the same as the tax limit. The usage of the term "tax limit" is associated with the theory of tax incidence in the 1970s. A. Laffer illustrated the interconnection between the amount of tax revenues and the value of tax rates [10]. The usage of the "limit" category is caused by the definition of the extremum point of the specified function, which means the tax rate that maximizes tax revenues. Therefore, the tax limit should be considered as maximum tax payments that may be withdrawn. It includes the tax potential within the current tax system and the tax gap.

Figure 1. Graphical representation of the interconnection between concepts "tax potential" – "tax gap" – "tax limit"



Source: Pugachev A.A. *Development of the Region's Tax Potential within Improving Tax Federalism:* diss. … cand. of econ. sci.: 08.00.10. Yaroslavl, 2016. P. 42.

The ratio of these categories is schematically shown in *Figure 1.*

On the abscissa axis, tax rates are deferred (T), on the ordinate axis – the tax base level (У). T_0 is a current tax rate at which taxpayers declare the tax base $У_0$, while the actual tax base is $У_1$. Rectangle $0У_0AT_0$ represents an actual tax paid or realized tax potential, and rectangle $0У_1BT_0$ represents a nominal tax potential. The difference between the tax potential and actual tax revenues, which is the area of the rectangle $У_0У_1BA$, represents the tax gap. The tax limit will be reached (hypothetically), if the tax rate T_1 at which, according to A. Laffer, the maximum budget revenue is generated, is applied to the actual tax base of $У_1$. Its value is defined by the rectangle $0У_1CT_1$.

It seems that today, in financial science, the value of the ratio of realized and nominal tax potential increases just like possibilities of its usage in the practical sphere. The corresponding ratio, disclosed by the definition of "tax effort", is used by foreign researchers. For example,

[6] Pugachev A.A. *Development of the Region's Tax Potential within Improving Tax Federalism:* diss. ... cand. of econ. sci.: 08.00.10. Yaroslavl, 2016. 179 p. P. 54.

L. Alfirman [11] defines tax effort as the ratio of actually accumulated tax revenues to estimated (potential) tax revenues. This position is shared by R.M. Bird, J. Martinez-Vazquez, B. Torgler [12]. Accordingly, these categories are directly related to the tax gap: the indicator of the tax gap is implemented in its calculation.

Tax gap factors

The tax gap is the difference between the nominal and realized tax potential, and it is determined by the impact of the scale of the shadow economy, corruption, tax evasion, quality of tax administration, and other factors. The definition of the list of these factors may vary depending on research objectives. Let us review some identification options and classifications of tax gap factors.

A large number of states are interested in quantitative assessment of the tax gap. Currently, countries of the former Soviet Union also joined them. However, officially published methodological designs are presented only by the USA, individual countries of Latin America, and the EU [13, p. 136].

While determining the tax gap, the department of Tax Revenue and Customs in Great Britain takes into account losses caused by activities of organized criminal groups, participation of economic entities in the shadow economy, the usage of tax evasion schemes, distortion of a taxable object, interpretation of tax consequences of complex economic operations, errors, and negligence of the necessary level of caution and non-payment[7].

The US Chamber of Commerce assesses the tax gap according to three factors: understatement of tax obligations on timely filed tax declarations; underpayment of taxes owed due to timely filed declarations; understatement of tax obligations by evading payments with the absence of a tax declaration[8].

Scientists identify main factors of the tax gap: the shadow economy and criminal business, abuse of offshore zones, errors, or negligence of taxpayers [14, p. 7; 19, p. 60]. A set of tax gap factors may differ depending on research objectives – it causes scientific discussions. For example, the provision of tax benefits and losses of organizations are reviewed as factors [16, p. 137].

Thus, researchers' approaches to determining a set of factors of the tax gap are very similar. These include the shadow economy, tax evasion, and the quality of tax control and administration.

Information and methodological basis for the study of factors that determine the tax gap

The author's methodology for analyzing the structure and dynamics of tax gap factors at the regional level includes the following stages.

1. Collection of statistical data and determination of tax gap estimated components.
2. Calculation of indicators.
3. Analysis of the structure and dynamics of the tax gap.
4. Assessment of the results and drawing conclusions on the components of the tax gap and the prospects of its reduction.

In this study, the tax gap includes amounts of owed taxes, fees, and other mandatory payments administered by the Federal Tax Service (FTS), amounts of additional taxes and fees based on the results of tax audits, and estimated data on the scale of the shadow economy. In another words, according to factors which are represented by available statistical

[7] *Measuring Tax Gaps. 2015 edition. Tax Gap Estimates for 2013–14.* HM Revenue & Customs, 2015. Available at: https://www.gov.uk/government/statistics/measuring-tax-gaps (accessed: November 30, 2019).

[8] *Tax Gap. Multiple Strategies Are Needed to Reduce Noncompliance.* United States Government Accountability Office, May 9, 2019. Available at: https://www.gao.gov/assets/700/698969.pdf (accessed: November 30, 2019).

data. The first two components are based on official statistical and analytical data of FTS RF – according to following reports: no.1-NM "Report on the accrual and receipt of taxes, fees, insurance premiums, and other mandatory payments to the budget system of the Russian Federation", no.4-NM "Report on arrears of taxes, fees, insurance premiums, penalties and tax sanctions to the budget system of the Russian Federation", no.2-NK "Report on the results of control work of tax authorities" [9]. The third component is based on official Rosstat data on the share of non-observed economy in GDP, and it includes operations of the shadow and informal sector that are not observed by direct statistical methods[10]. The shadow sector is formed by taxpayers who deliberately avoid paying taxes or complying with legislation [17, p. 46–47]. The informal sector is a productive activity carried out by households that are not registered as organizations, sole proprietors, or self-employed citizens.

Each of these factors is defined separately. To calculate tax and fee arrears at all levels of the budget system at the end of the year without arrears that should not be collected by tax authorities, its components must be deducted from total tax arrears:

– deferred (installment) payments,

– arrears suspended for collection,

– arrears recovered by bailiffs, according to the resolution on initiation of Executive production,

– arrears that cannot be recovered by tax authorities.

The potential for additional taxes and fees in case of 100% coverage of taxpayers by audits is determined by the reverse account based on the amount of additional accrued taxes according to the results of tax audits and the share of taxpayers covered by tax audits.

The tax potential of the non-observed economy is calculated as the product of the share of the unobservable economy and the amount of tax revenues of all levels of the budget system from taxpayers in a given region. The tax gap calculation scheme, used in this study, is represented by the formula (1).

$$Tax\ gap = TD + TPTK + TPSE, \quad (1)$$

where *Tax gap* is the tax gap,

TD – the tax gap according to tax arrears,

TPTK – potential of additional tax assessment, if audits cover 100% of taxpayers,

TPSE – tax capacity of the non-observed economy.

Each of the components is calculated using the following formulas (2) – (4).

$$TD = TTD - TDa - TDb - TDc - TDe, \quad (2)$$

where *TTD* – total tax arrears,

TDa – tax arrears suspended for collection by the tax authorities,

TDb – tax arrears that cannot be collected by tax authorities,

TDc – tax arrears collected by bailiffs,

TDe – deferred (installment) payments.

$$TPTK = \frac{TP \times (1-d)}{d}, \quad (3)$$

where *TP* is the amount of additional tax accrual based on the results of tax audits,

d is the percentage of taxpayers covered by tax audits.

$$TPSE = TR \times SE, \quad (4)$$

where *TR* is the amount of tax revenues of the consolidated budget of the Russian Federation from taxpayers in a region (full realized tax potential),

SE is the share of non-observed economy.

[9] Data on forms of statistical tax reports. *Federal Tax Service of Russia*. Available at: http://www.nalog.ru/rn76/related_activities/statistics_and_analytics/forms/#t2 (accessed: November 30, 2019).

[10] Adjustment of gross value added of economic operations that are not observed by direct statistical methods. *Federal Tax Service of Russia*. Available at: http://gks.ru/storage/mediabank/tab14-19-2.xls (accessed: November 30, 2019).

Let us define assumptions for assessing the tax gap.

First, we define the tax gap of each region for the consolidated budget of the Russian Federation as a whole, that is, as a complete tax gap for all taxes and fees regardless of the distribution of tax revenues across the levels of the budget system.

Second, while estimating the share of the non-observed economy in regions, the assumption that the share of the non-observed economy in federal subjects is equal to the average share of non-observed economy in Russia is used. This assumption is caused by the lack of official statistics on non-observed economy within the Russian Federation's constituent entities. However, it is necessary to understand that the difference may be significant [18, p. 2017–2018]. According to the methodology of Rosstat, economic operations that are not observed by direct statistical methods include shadow, illegal, and operations in the informal sector. Illegal operations are prohibited, and Rosstat does not currently count in non-observed economy. The absence of its accounting does not affect the tax gap, since prohibited activities do not form the tax potential, and taxation is not provided for it.

Third, we assume that full coverage of all taxpayers by tax audits will increase the additional accrual of taxes and fees proportionally to the additional assessment with the actual coverage of taxpayers by tax audits. Considering current trends and the quality of control work of tax authorities, the usage of a risk-based approach to tax audits, it can be assumed that the level of additional charges for non-covered tax audits of taxpayers will be lower than for the covered one. This is caused by the usage of a risk-based approach by FTS units, which assumes that site inspections are aimed at those taxpayers who, most likely, made violations of tax legislation while calculating and paying taxes which is defined by tax authorities as the result of pre-inspection analysis. In this regard, while calculating the share of taxpayers covered by tax audits, on-site and off-site inspections are considered as reflected in the report no. 2-NK. At the same time, it is likely that, with further development of tax administration and control, new tax schemes and identification mechanisms will be identified, which were not previously known to tax authorities, that will further increase the collection of taxes and fees and reduce the tax gap. For example, currently used tax schemes for corporate income tax, through splitting, or, on the contrary, consolidation of businesses, including the largest taxpayers, which causes huge damage to regional budgets and especially ones with a mono-structured tax base due to the lack of transparency in the administration of profits of major corporations [19, p.113].

Fourth, when calculating the share of taxpayers covered by tax audits, it is assumed that 1 taxpayer has 1 tax audit per year, which may often be different. The usage of this approach is dictated by the lack of relevant statistical data on tax audits in the context of taxpayers.

Fifth, the used approach does not take into account behavioral responses of taxpayers to the actions of authorities to change tax legislation, reduce the tax gap, and improve tax administration. The latter assumption is probably common to all tax gap calculations today

Analysis of the structure and dynamics of tax gap factors at the regional level

Let us consider the implementation of the second stage of the methodology for analyzing the structure and dynamics of tax gap factors on the example of the Yaroslavl Oblast which is an old industrial region located in the North of

the European territory of Russia. It is a part of the Central Federal District, with indicators of socio-economic development close to national average ones[11].

At the second stage, indicators are calculated. *Table 1* shows the calculation process and results for 2011 and 2015–2017. The most relevant statistical GRP data are data for 2017, which determined the boundary of the analyzed period. To ensure the possibility of analyzing the dynamics of indicators, 2011 was the earliest in retrospect, for which all the necessary statistical data on current forms of reporting of the FTS and Rosstat are available.

Table 1. Algorithm for determining the structure and dynamics of factors that form the tax gap, on the example of the Yaroslavl Oblast

Indicators	2011	2015	2016	2017	Growth rates, 2017 to 2011
1. Tax and fee arrears to all levels of the budget system at the end of the year, mil. rub., *incl.*	5 965.9	7 488.9	16 323.6	11 181.9	1.87
1.1. collected by bailiffs, mil. rub.	1 322.0	1 380.4	1 289.4	1 300.4	0.98
1.2. deferred payments, mil. rub.	3.9	0.8	19.6	21.4	5.49
1.3. suspended for collection, mil. rub.	1 035.1	1 042.6	9 052.7	1 585.7	1.53
1.4. impossible to collect, mil. rub.	49.1	26.9	31.8	39.2	0.80
2. Tax gap in tax arrears, mil. rub. (1 – 1.1 – 1.2 – 1.3 – 1.4)	3 382.8	4 991.6	5 771.8	8 146. 4	2.41
3 Amount of taxes and fees additionally accrued according to the results of tax audits, mil. rub.	1 677.2	1 282.0	1 623.0	1 316.4	0.78
4. Percentage of taxpayers covered by tax audits, %	52.6	42.7	56.9	79.3	1.51
5. Potential for additional taxes and fees in the case of 100% coverage of taxpayers by audits, mil. rub. (3 × ((100%-4) / 4))	1 508.8	1 722.8	1 229.1	344.3	0.23
6. Share of non-observed economy in GRP, %	14.6	13.2	13.2	12.7	0.87
7. Realized tax potential – the amount of tax revenues of budgets of all levels of the budget system from taxpayers in the region, mil. rub.	70 747.2	105 749.0	125 652.1	142 075.1	2.01
8. Tax potential of non-observed economy, mil. rub. (6 × 7)	10 329.1	13 958.9	16 586.1	18 043.5	1.75
9. Ta gap, mil. rub. (2 + 5 + 8)	15 220.7	20 673.3	23 587.0	26 534.3	1.74
10. GRP, mil. rub.	286 967.5	443 054.1	472 344.0	510 631.5	1.78
11. Tax gap in tax arrears, % to tax gap (2 / 9 × 100%)	22.23	24.15	24.47	30.70	1.38
12. Tax gap in tax arrears, % to realized tax potential (2 / 7 × 100%)	4.78	4.72	4.59	5.73	1.20
13. Tax gap in tax arrears, % to GRP (2 / 10 × 100%)	1.18	1.13	1.22	1.60	1.36
14. Potential for additional taxes and fees in the case of 100% coverage of taxpayers by audits, % to tax gap (5 / 9 × 100%)	9.91	8.33	5.21	1.30	0.13
15. Potential for additional taxes and fees in the case of 100% coverage of taxpayers by audits, % to realized tax potential (5 / 7 × 100%)	2.13	1.63	0.98	0.24	0.11
16. Potential for additional taxes and fees in the case of 100% coverage of taxpayers by audits, % to GRP (5 / 10 × 100%)	0.53	0.40	0.26	0.07	0.13

[11] In the structure of GRP in the Yaroslavl Oblast, the largest share is formed by processing productions ™ 27%; trade ™ 16%; transport and communications ™ 12%. According to the volume of shipped goods of own production, this Oblast is placed 69th in Russia, according to processing productions ™ 32nd, according to per capita GRP level ™ 36th, according to the level of trade turnover per capita ™ 38th, according to the average nominal gross wage ™ 42nd, according to per capita investment in fixed capital ™ 61st (as of 2018). Note: calculated by authors according to data [21].

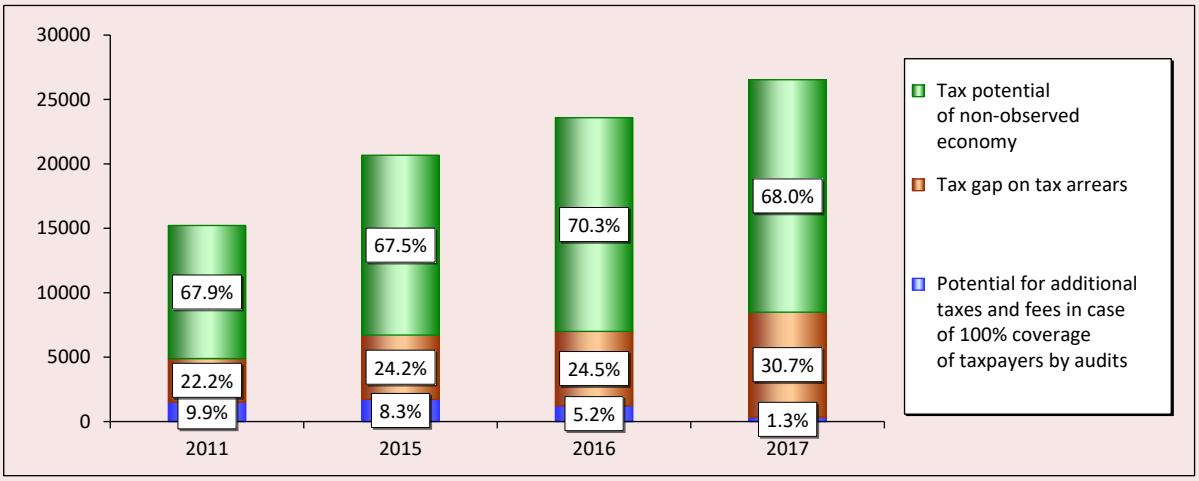
End of Table 1

Indicators	2011	2015	2016	2017	Growth rates, 2017 to 2011
17. Tax potential of non-observed economy, % to tax gap (8 / 9 × 100%)	67.86	67.52	70.32	68.00	1.00
18. Tax potential of non-observed economy, % to realized tax potential (8 / 7 × 100%)	14.6	13.2	13.2	12.7	0.87
19. Tax potential of non-observed economy, % to GRP (8 / 10 × 100%)	3.60	3.15	3.51	3.53	0.98
20. Tax gap, % to realized tax potential (9 / 7 × 100%)	21.51	19.55	18.77	18.68	0.87
21. Tax gap, % to GRP (9 / 10 × 100%)	5.30	4.67	4.99	5.20	0.98
Calculated by: Data on forms of statistical tax reports. Federal Tax Service of Russia. Available at: http://www.nalog.ru/rn76/related_activities/statistics_and_analytics/forms/#t2 (accessed: November 30, 2019); Adjustment of gross value added of economic operations that are not observed by direct statistical methods. Federal Tax Service of Russia. Available at: http://gks.ru/storage/mediabank/tab14-19-2.xls (accessed: November 30, 2019); Gross regional product by entities of the Russian Federation in 1998–2017. Federal State Statistic Service of the Russian Federation. Available at: http://gks.ru/storage/mediabank/rozn32(1).xls (accessed: November 30, 2019).					

Based on conducted calculations, the third stage analyzes the dynamics and structure of the tax gap.

In general, the tax gap in the Yaroslavl Oblast increased from 15.2 to 26.5 billion rubles, i.e. by 11.3 billion rubles. Since the data are presented in nominal terms, it is necessary to consider relative indicators. The growth rate of the tax gap was 74.3% against the background of 77.9% GRP increase and a 101% increase of full realized potential, which indicates a positive trend of outpacing the growth rate of tax revenues and GRP over the growth rate of the tax gap. It is also confirmed by the continuing reduction of the tax gap from 5.3% to 5.2% of GRP or 21.51% to 18.68% of tax revenues to the consolidated budget of the Russian Federation from regional taxpayers. It is worth noting, however, that, in 2016 and 2017, the ratio of the tax gap to GRP increased from 4.67% to 5.2%.

Figure 2. Structure and dynamics of factors forming the tax gap of the Yaroslavl Oblast in 2011, 2015–2017



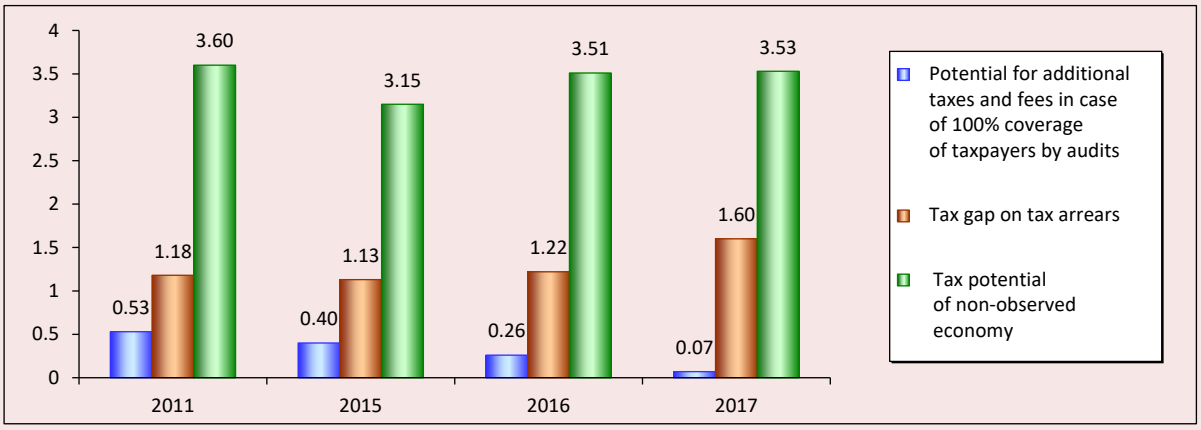
The ordinate axis shows the value of the tax gap in billion rubles, and % shows the share of factors in the tax gap.

Source: own compilation according to data in Table 1.

For each of three components of the tax gap, as well as for the final result, it is possible to calculate the ratio with the realized full tax potential of a region, which is the sum of tax revenues of budgets of all levels of the budget system from reginal taxpayers, and the GRP. The structure and dynamics of tax gap factors in the Yaroslavl region in 2011, 2015–2017 are presented in *Figure 2*.

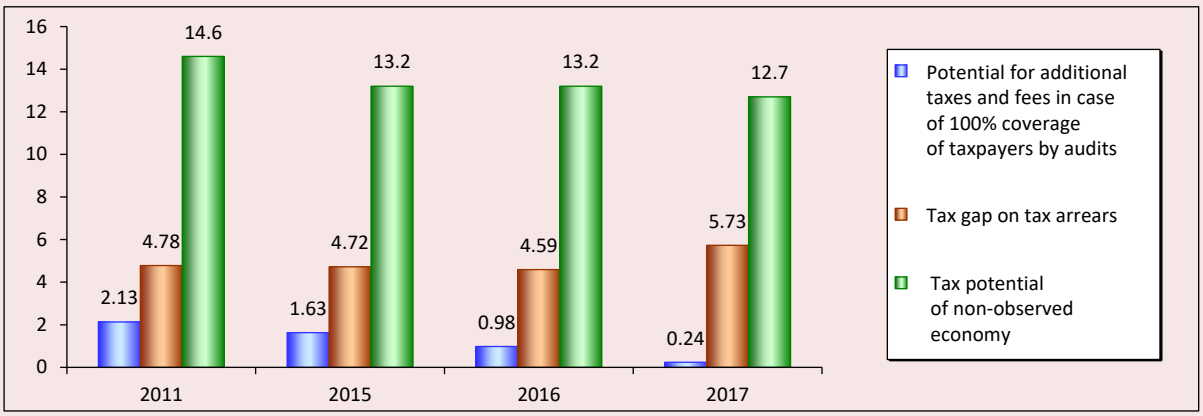
The growth of the tax gap of the Yaroslavl Oblast is caused by the dynamics of the tax potential of the non-observed economy and the gap of tax arrears. In the studied period, the combined share of these factors in the tax gap increased from 90.1% to 98.7%. At the same time, the share of the tax potential of the shadow economy remains stable in the range of 67.5–70.3%, and, in absolute terms, the increase was 7.3 billion rubles (from 10.3 to 18 billion rubles) despite the decrease of the share of the non-observed economy in GRP. The tax gap in tax arrears has increased significantly from 22.2% to 30.7%, or by 4.7 billion rubles. (from 3.4 to 8.1 billion rubles). At the same time, the potential for additional taxes and fees in case of 100% coverage of

Figure 3. The ratio of factors, forming the tax gap, to the GRP of the Yaroslavl Oblast in 2011, 2015-2017, %



Source: own compilation according to data in Table 1.

Figure 4. The ratio of factors, forming the tax gap, to the fully realized tax potential of the Yaroslavl Oblast in 2011, 2015-2017, %



Source: own compilation according to data in Table 1.

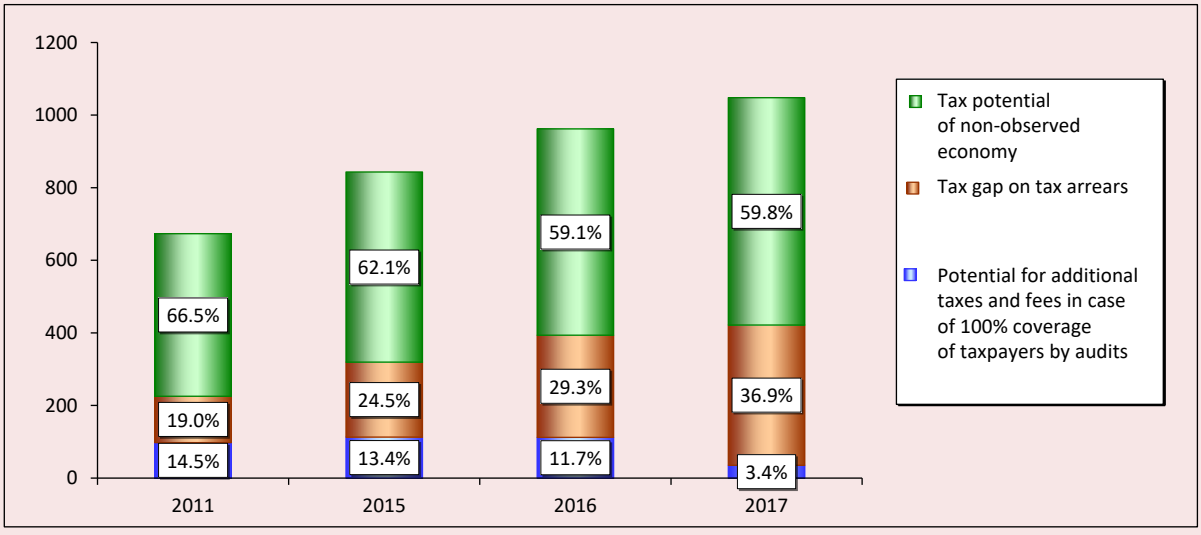
taxpayers by tax audits has decreased from 1.5 to 0.3 billion rubles, and, currently, it does not actually affect the formation of the tax gap. This dynamic is caused by the work of FTS RF to improve tax control. The coverage of taxpayers by tax audits increases with the decrease of the number of on-site inspections, and the volume of predicative analytical procedures of tax authorities also increases.

The correlation of the Yaroslavl Oblast's tax gap factors with the GRP and fully realized tax potential is shown in *Figures 3* and *4*, where the ratio in a percentage is deferred along the ordinate axis.

The ratio of tax gap factors and GRP indicates the reduction of the potential for additional taxes and fees based on the results of tax audits and the increase of the tax gap for tax arrears in the Yaroslavl Oblast. The tax gap in 2017, in comparison to 2011, decreased in relation to GRP and tax revenues. For tax authorities, prospects for reducing the tax gap nowadays are not related to tax control but to the sphere of working with tax arrears, which forms about 30.7% of the tax gap. The key area of reducing the tax gap is the work on legalizing the shadow economy, which, even according to official statistics, reduces slowly. It requires the implementation of state measures. The analysis of tax gap factors was conducted for each region separately, for federal districts, and for the Russian Federation as a whole. For CFD, the results are shown in *Figure 5*.

In general, the dynamics and structure of tax gap factors in CFD are similar to those in the Yaroslavl Oblast. The difference is a more significant, almost twofold increase of the share of the tax gap for tax arrears; the share of the tax gap for the shadow economy in CFD is lower by 8.2 percentage points (59.8% vs. 68% in the Yaroslavl Oblast). It is characterized by a higher quality of work of tax authorities of the Yaroslavl Oblast with debt and a more positive level of solvency of taxpayers in comparison with CFD as a whole.

Figure 5. Structure and dynamics of factors forming the tax gap of the Central Federal District in 2011, 2015–2017



The ordinate axis shows the value of the tax gap in billion rubles, and % shows the share of factors in the tax gap.
Source: own calculation according to FTS RF and FSSS RF.

Table 2. Dynamics of the tax gap in federal districts of the Russian Federation in 2011, 2015–2017

Federal districts	Tax gap, billion rub.				Tax gap, % to fully realized tax potential	Tax gap, % to GRP
	2011	2015	2016	2017	2017	2017
Central	673.30	843.30	962.03	1 047.93	21.25	4.01
Norhwestern	184.44	268.04	306.24	316.24	15.20	3.86
North Caucasian	89.92	114.15	122.58	73.60	38.95	3.95
Southern	99.15	149.12	164.58	155.46	16.76	2.90
Volga (Privolzhsky)	294.41	392.56	417.42	453.39	16.13	4.11
Ural	398.94	513.11	479.39	583.95	14.12	5.47
Siberian	191.02	238.09	251.20	271.54	16.51	3.50
Far Eastern	84.29	128.00	129.28	111.07	17.80	2.86
RF	2 026.92	2 678.34	2 858.65	3 028.37	17.46	4.04

For reference: data for no SFD in 2015 were given taking into account CFD affiliated with SFD since 2016.
Source: own compilation according to FTS RF and FSSS RF.

Summary data on the dynamics of the tax gap for the Russian Federation and federal districts are shown in *Table 2*.

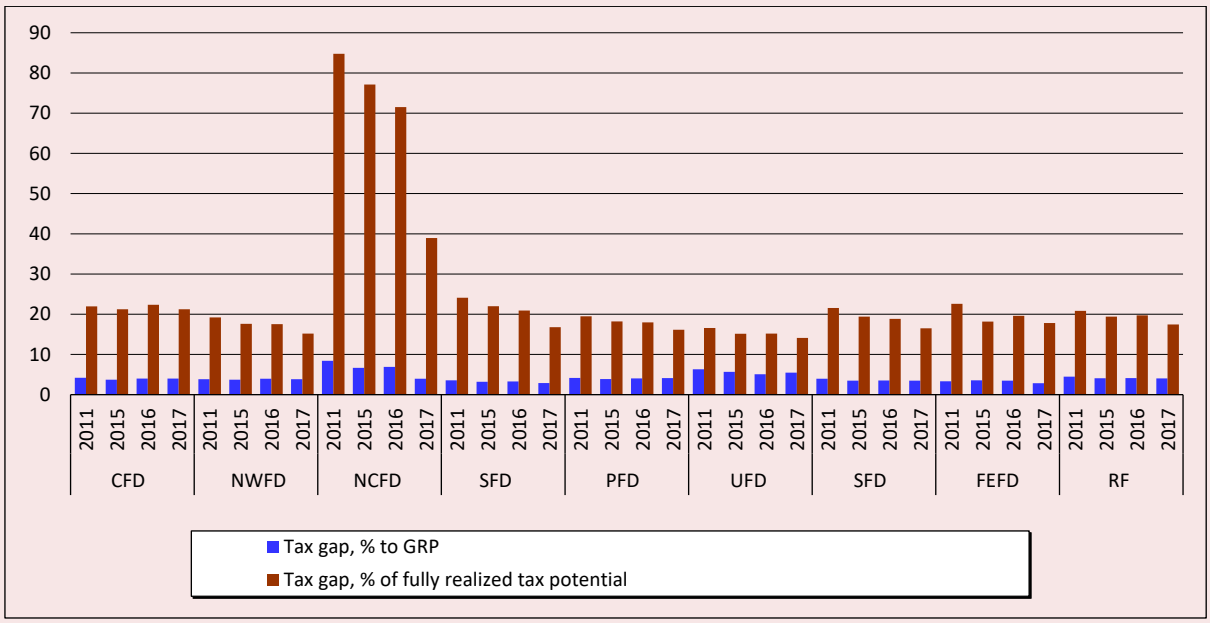
In Russia, the tax gap in 2011–2017 increased in nominal prices by 1.5 times: from 2 to 3 trillion rubles. In relation to tax revenues of the consolidated budget of the Russian Federation, the tax gap decreased from 20.9% to 17.5%, or by 3.4 percentage points, as did the ratio of the tax gap to GDP from 4.5% to 4%. In general, this is a positive trend, indicating a faster growth rate of tax revenues and GRP in relation to the tax gap. For comparison, we would like to note that, in the United Kingdom, the tax administration estimates the gap at 5.6% of tax revenues [6]; in EU countries, researchers estimate up to an average of 10.7% of GDP (1.6–13.8%) [16, p. 67]. However, it needs to be considered that this difference in levels is caused not only by the difference of the gap but the difference between methods of its calculation, primarily due to the difference estimates of the shadow economy.

In absolute terms, there was also the increase of the tax gap in federal districts with the exception of the North Caucasian Federal District, where, in 2017, it decreased by 40%, or 49 billion rubles, while its ratio to the realized tax potential remains the highest in the country (39%) with an average level in relation to GRP. The general reason for this situation is the low level of tax potential implementation and the low tax burden in regions of the NCFD. The minimum level of the tax gap in relation to GRP is observed in SFD and FEFD. The dynamics of the ratio of the tax gap with studied indicators is shown in *Figure 6*.

For the entire studied period, the maximum tax gap in relative terms was formed in the NCFD. The relative size of the tax gap reduced in all federal districts. Let us review the ratio of the structure of the tax gap of federal districts in *Figure 7*, where the share of each factor in the tax gap is represented.

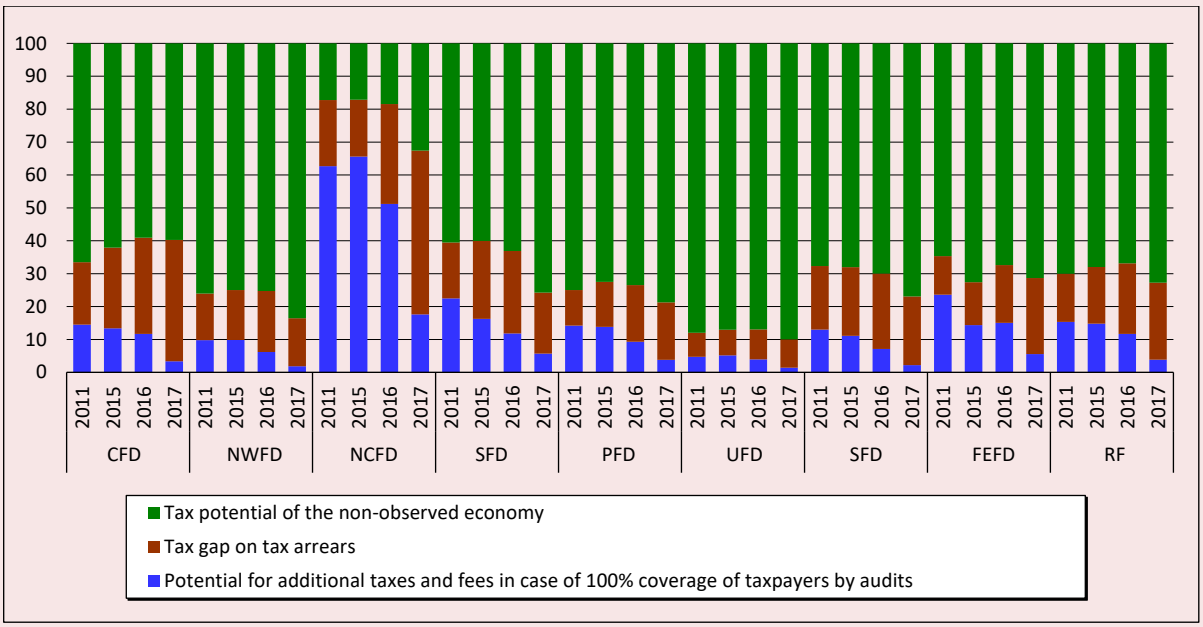
In all federal districts, there was the reduction of the share of the potential for additional taxes and fees in case of 100% coverage of taxpayers by inspections, which confirms the improvement of the quality of tax authorities' control activities. The highest share remains in NCFD – 17.6%, and the lowest – 1.4% – in UFD. The share of the non-observed economy in the tax gap (68%) remains high: its increase was noticed in NWFD, NCFD, SFD, and SFD (Southern). The maximum share of the non-observed economy in the tax gap is in UFD – 90% in 2017. It shows that the potential of reducing the tax gap at the expense of work

Figure 6. Dynamics of the ratio of the tax gap with the full realized tax potential and the GRP of federal districts in 2011, 2015–2017, %



Source: own calculation according to FTS RF and FSSS RF.

Figure 7. Structure of tax gap of federal districts in 2011, 2015–2017, %



Source: own calculation according to FTS RF and FSSS RF.

of tax authorities is greatly implemented. The share of the tax gap on tax arrears also increased by 8.5 p. p.: from 22.2 to 30.7%. Its largest growth was recorded in CFD, NCFD where it is the highest in the country – 49.8%, as well as in FEFD. The share of the tax gap on tax arrears remains low and minimal in UFD – 8.6% in 2017.

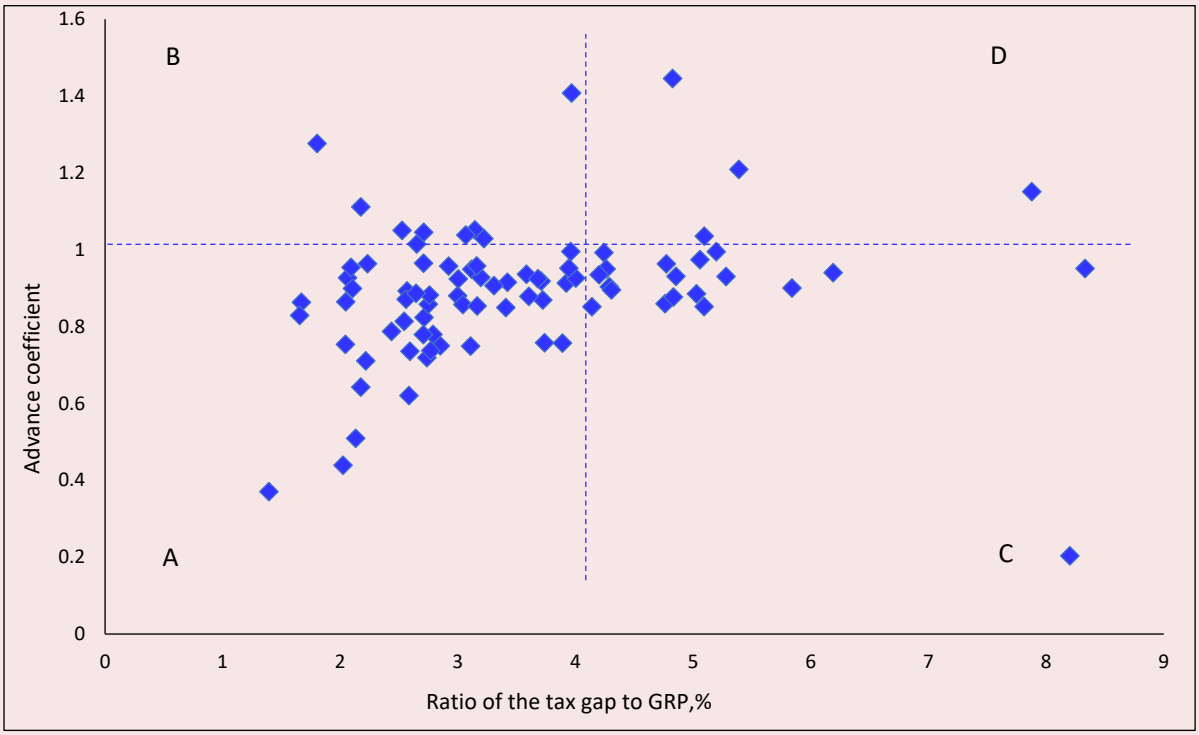
The assessment of the tax gap at the regional level assumes the possibility of grouping regions by the level of the tax gap considering the tendency to reduce or, on the contrary, increase it. This classification may be based on the ratio of the level of the tax gap to the GRP and the coefficient of advance of the growth rate of the tax gap in relation to the growth rate of the realized tax potential.

The growth rate may be calculated in comparison with previous year or for a certain period. According to the first indicator – the level of the tax gap to the GRP – the division is relative to its average value for the country, for example, above average and below average. At the same time, it is possible to choose the division into a different number of groups with defined distribution boundaries. According to the second indicator – coefficient of the advance of the tax gap growth in relation to the growth rate of the realized tax potential – classification is conducted in relation to 1. It means that regions with the faster growth of tax capacity, or decreasing gap, and regions with growing tax gap are defined. Thus, there are 4 groups of regions:

A: with a low level of the tax gap and a tendency to its further reduction,

B: with a low level of the tax gap and a tendency to its further increase,

Figure 8. Grouping of federal entities by the level and dynamics of the tax gap in 2017



Source: own calculation according to FTS RF and FSSS RF.

C: with a high level of the tax gap and a tendency to its further reduction;

D: with a high level of the tax gap and a tendency to its further increase.

Let us review the distribution of Russian regions in 2017 (coefficient of advance of the growth rate of the tax gap in relation to the growth rate of the realized tax potential in 2017 in relation to 2016, *Fig. 8*).

Most regions of the Russian Federation (52) in 2017 were placed in group A. The distribution of regions is given in *Table 3*.

Presented classification of regions allows us to draw conclusions about the quality of work of regional tax and financial authorities to reduce the tax gap based on the ratio of its level and dynamics. This ratio, taking into account the factor analysis of the tax gap, also allows proposing recommendations for reducing the tax gap in regions by working with one or another factor that forms it. To decrease the non-observable economy in the shadow sector, it is advisable, for example, to reduce cash payments, in the informal sector – an experiment with the introduction of a tax on professional income for self-employed citizens opens up some opportunities. The reduction of the tax gap on tax arrears requires the improvement of work of tax authorities, in particular, on debt restructuring and guarantee provision of arrears, interaction with credit organizations, sale of debtors' property, etc. The improvement of the quality of tax authorities' control work to reduce the tax gap in a corresponding part is possible through further development of centralized approaches to tax audits and the development of a tax monitoring online system for major taxpayers with tax authorities' access to tax and accounting records of a taxpayer within Section V. 2 of Part 1 of the Tax Code of the Russian Federation.

Table 3. Grouping of federal entities by the level and dynamics of the tax gap in 2017

Advance coefficient of the tax gap's growth rate to the growth rate of the fully realized tax potential of the region	Ratio of the tax gap to GRP, %	
	Below average (<4.042%)	Above average (>4.042%)
Advance growth of the tax gap in relation to realized tax potential (>1)	B: Regions with a low level of the tax gap but with a tendency to its increase 9 regions	D: Regions with a high level of the tax gap which continues to increase 4 regions
	Republic of Dagestan, Chechnya, Buryatia, Khakassia, Zabaykalsky Krai and Primorsky Krai, Amur, Magadan oblasts, Sevastopol	Smolensk, Omsk oblasts, Republic of Ingushetia and Karachay-Cherkess Republic
Advance growth of the tax gap in relation to the tax gap (>1)	A: Regions with a low level of the tax gap and a tendency to its further reduction 52 regions	C: Regions with a high level of the tax gap and a tendency to its further reduction 19 regions
	Belgorod, Bryansk, Vladimir, Voronezh, Ivanovo, Kaluga, Kostroma, Kursk, Lipetsk, Oryol, Tambov, Tver, Tula, Arkhangelsk, Vologda, Murmansk, Novgorod, Pskov, Volgograd, Kirov, Nizhegorod, Penza, Ulyanovsk, Kurgan, Sverdlovsk, Rostov, Tumen, Chelyabinsk, Kemerovo, Novosibirsk, Sakhalin oblasts, Jewish Autonomous Oblast, Republic of Karelia, Komi, Adygea, Kalmykia, Crimea, Bashkortostan, Mari El, Mordovia, Tatarstan, Chuvashia, Altai, Tuva, Sakha (Yakutia), Altai, Stavropol, Krasnodar, Krasnoyarsk, Kamchatka, Khabarovsk krai, Chukotka AO	Moscow, Ryazan, Yaroslavl, Kaliningrad, Leningrad, Astrakhan, Orenburg, Samara, Saratov, Irkutsk, Tomsk oblasts, Republic of North Ossetia – Alania, Kabardino-Balkaria, Udmurtia, Perm Krai, Moscow, Saint-Petersburg, Khanty-Mansi AO – Yugra, Yamalo-Nenets AO
Source: own calculation according to FTS RF and FSSS RF.		

Conclusions and discussion of results

Within the study of the tax gap at the regional level in the Russian Federation and the assessment of factors that form it, the following conclusions were obtained.

1. It is defined that approaches to determining the tax gap by domestic and foreign researchers are largely similar. In general, the tax gap may be defined as the difference between actual tax revenues and estimated ones that could be added to the budget, if all taxpayers complied with the legislation. In other words, as the difference between actual tax revenues and tax potential.

2. It is proved that the tax gap is defined by the impact of the scale of the shadow economy, corruption, tax evasion, the quality of tax administration, and other factors. Identification of the list of these factors may depend on research objectives. The issue of accounting the loss of tax revenues due to tax benefits, or so-called tax expenditures, as a factor of the tax gap is debatable. Since 2016, official registers of state tax expenditures have been maintained, including regional ones11. At the same time, tax benefits form not the tax gap but the difference between the nominal tax potential and the tax limit (Fig. 1), since these are legitimate elements of reducing the tax burden for certain categories of taxpayers, so it seems that it is incorrect to include tax benefits in the tax gap.

3. The author's method of the analysis of the structure and dynamics of the tax gap at the regional level, which allows, unlike existing ones, assessing the scope and the structure of the tax gap of a region in absolute and relative terms and giving opportunities for comparative assessment of regions on the tax gap and its defining factors, is presented. The usage of the author's proposed allows drawing conclusions about the quality of work of tax and financial authorities in a region with debt and tax control and administration, as well as identifying and analyzing prospects and reserves for reducing the tax gap.

4. As of January 1, 2018, the tax gap in the Russian Federation was 3.03 trillion rubles. From 2011 to 2017, the tax gap, in relation to tax revenues of the consolidated budget of the Russian Federation, decreased from 20.9% to 17.5% or by 3.4 percentage points, as did the ratio of the tax gap to GDP – from 4.5% to 4%. Despite the positive dynamics, the tax gap of 3.03 trillion rubles, or 4% of GDP, or 17.5% of tax revenues of the consolidated budget, is a significant indicator in terms of opportunities to increase budget revenues and reduce public arrears and, accordingly, the growth of public investment and social spending. The relative size of the tax gap has been reduced in all federal districts. The reduction of the share of additional tax and fee potential in case of 100% coverage of taxpayers by audits was also noted, which confirms the improvement of the quality of control activities of tax authorities. The share of the non-observed economy in the tax gap remains consistently high (68%). The share of the tax gap on tax arrears has also increased from 22.2% to 30.7%.

5. The author's version of the grouping of federal entities in relation to the state and prospects of reducing the tax gap, which is based on the ratio of its level and dynamics, is proposed. This grouping of regions allows us to draw conclusions about the quality of work of regional tax and financial authorities and form recommendations for reducing the tax gap due to the work of a specific factor that forms it. For example, reducing cash payments, improving

[11] Register of tax benefits (tax expenditures) established by laws of entities of the Russian Federation for 2016–2017 with an estimate for the forecast period until 2021. Ministry of Finance of the Russian Federation. Available at: https://www.minfin.ru/ru/perfomance/budget/policy/# (accessed: November 30, 2019).

the work of tax authorities on restructuring and guaranteeing tax arrears, interacting with credit organizations, selling debtors' property, developing centralized approaches to tax audits, and developing a tax monitoring system for major taxpayers.

The conducted research suggests that the potential for reducing the tax gap in Russia at the expense of improving the quality of tax authorities' control work has been largely implemented. Work with tax arrears provides opportunities for financial and tax authorities. In general, the shadow economy has the largest share in the tax gap – up to 68%. This share is defined according to official statistical data (12–15%). If alternative estimates, which reach 23–44%, would have been used [3, p.9], then the indicator would be significantly higher in absolute and relative terms. It confirms the importance of activating comprehensive work of state bodies to legalize the shadow economy.

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Regulation of Financial Behavior of the Population of Modern Russia: Regulatory Context Formation and Personal Development

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Abstract. Making premature financial decisions can negatively affect individual households and society as a whole, so public authorities, using various management mechanisms, regulate the population's financial behavior. The article attempts to understand how the state regulation of the population's financial behavior presents interventions in order to "change the context" (in particular, the regulatory and procedural foundations of the financial system) and to "change cognition" (in our case – "human change", in particular personal knowledge and attitudes). Similar research topics cover the legal basis of financial organizations, behavioral tools for managing the population's financial behavior, the ways to improve their financial literacy, and so on. In contrast, the present study first reflects the views of alternative economic theories (rational choice theory, behavioral economics) on the possibility of regulating economic behavior, the techniques of behavioral "nudging" widely spread in foreign countries are given; second, a scheme for regulating the financial behavior of the Russian population is proposed and the main regulatory documents regulating the activities of financial organizations in the country are analyzed; third, the relation between the regulation lines of "change the context" and "human change" is estimated. It is shown that the impact on the financial behavior of the Russians is mainly devoted to the "change the context", i.e. at building a bona fide institutional financial system. The impacts in the line of "human change" are secondary; they are implemented through improving financial literacy and introducing mass financial products. This regulation allows a bias towards the person's "passivity".

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The elimination of the identified imbalance will improve the effectiveness of management decisions regarding the citizens' financial behavior. It is proposed to redirect interventions from the construction of an "ideal" regulatory context of the financial system to the development of a literate and financially active population, able to form the necessary financial environment for the economy and society by their behavior.

Key words: financial behavior, government regulation, nudging, change the context, change cognition, financial literacy.

Introduction

All-Russian surveys regularly reveal actions with an increased risk of negative consequences for material well-being in the financial behavior of the Russians. For example, socially vulnerable groups of the population with low paying capacity are widely involved in credit practices: young families (spouses aged 25 to 40) with two minor children (50%), young (aged 25 to 40) single mothers with one child (45%) and two children (51%) take loans more actively than others[1]. There is a high percentage of the overindebted (those who pay more than 30% of their family income for loan repayments) among the low-income borrowers[2], it makes up 29% compared to 10% among the better-off[3]. Along with this, 44% of the Russians who took out a loan over the past year are loyal to the violation of credit agreements and believe that a small payment delay is not terrible, and 25% of the borrowers think that not to repay the loan is not a crime[4].

The prevalence of such financial practices has a very negative impact on both individual households and society as a whole. The state, unlike other economic agents, is not only interested in the population's competent financial behavior, but is also able to influence it and the financial system as a whole. Over the past 20 years, the targets for this impact have been increasing the volume of the population's organized savings, diversifying the financial instruments used by the population, and bringing the legal framework of the financial system up to modern international standards. A significant role in achieving these goals, along with social policy, labor and employment policy, education, health, and so on, is played by the policy on financial market regulation, which forms the regulatory framework for financial behavior of the population.

The problems of regulating the population's financial behavior are reflected in a number of scientific publications of Russian researchers. Their subject matter is mainly related to the legal regulation of the financial market and the activities of credit and non-credit financial organizations, the peculiarities of law enforcement practice and changes in legislation (V.A. Pozdyshev [1], V.G. Golubtsov [2]). A significant number of papers are devoted to the problem of improving financial literacy of the population (O.E. Kuzina and D.H. Ibragimova [3], A.V. Stakhnyuk and E.A. Izmalkova [4], G.V. Tsvetova and

[1] Borrower's portrait: who takes loans most often in Russia? *NAFI*. URL: https://nafi.ru/analytics/portret-zaemshchika-kto-v-rossii-chashche-vsego-beret-kredity/ (accessed 04.02.2020).

[2] Characteristic "Money is not enough even food" (NAFI survey).

[3] Borrower's portrait: who takes loans most often in Russia? *NAFI*. URL: https://nafi.ru/analytics/portret-zaemshchika-kto-v-rossii-chashche-vsego-beret-kredity/ (accessed 04.02.2020).

[4] Every fourth borrower believes that non-repayment of the loan is not a crime. *NAFI*. URL: https://nafi.ru/analytics/kazhdyy-chetvertyy-zaemshchik-schitaet-chto-nevozvrat-kredita-ne-yavlyaetsya-prestupleniem/ (accessed 04.02.2020).

M.V. Erofeeva [5]). The research on the impact of cognitive, psychological, and sociocultural factors on the population's financial behavior and their account in the practice of its regulation (T.N. Kolesnikova [6]), on the use of behavioral instruments in different areas of regulation and their possible embedding in the policy of the population's financial behavior management (A.E. Golodnikova et al. [7]) are less presented. A separate layer consists of the review, theoretical and methodological works, where the authors consider the provisions of the new behavioral economy, its influence on state policy and the ways of manipulating economic behavior (I.N. Drogobytsky [8], A. Zlotnikov [9], A. Shmakov [10]) or analyze the advantages and failures of state paternalism in terms of its impact on the economic behavior of the population as a whole (R.I. Kapelyushnikov [11; 12], A.Ya. Rubinshtein and A.E. Gorodetskii [13]).

At the same time, there are very few works aimed at studying the conceptual foundations of the current practice of regulating financial behavior in Russia, as well as the compliance of regulatory and procedural aspects of regulation with the modern views of economic science (in particular, the provisions of behavioral economics). In our opinion, in order to identify the opportunities for improving the effectiveness of the population's financial behavior regulation, it is important to understand what conceptual provisions of modern economic thought are used in the current regulatory system.

The purpose of our work is to systematize the regulatory and procedural aspects of the population's financial behavior regulating, which will allow to understand how the interventions aimed at "changing the context" (the regulatory framework of the financial market) and "human change" (personal beliefs and attitudes) are used in this area of state regulation. For this purpose, the first part of the paper examines the provisions of alternative economic theories (rational choice theory, behavioral economics) regarding the ability to regulate economic behavior, and provides the techniques of behavioral "nudging"; the second part presents a scheme for regulating the Russians' financial behavior, analyzes the main governing documents regulating the activities of the Russian financial system, shows the relation between the paradigms of "changing the context" and "human change".

Theoretical views on the possibility of regulating the population's financial behavior

The studies of the population's economic behavior are aimed to "explain, predict and learn how to influence the behavior of the person making the choice" [10, p. 98]. Initially, economics considered human behavior from the point of view of the "rational human" model (Homo economicus), which is based on a normative, a priori analysis of rational decision-making. In neoclassical theories of welfare and rational choice, considering a rational person with a clear structure of preferences, direct state intervention was considered unnecessary, and individual utility was the measure of quality of the economic policy (V. Pareto, J. Hicks, P. Samuelson) [14, p. 16]. According to the theory of rational choice, a person makes a deliberate, reasonable, rational choice for his or her own benefit. While the population in general is directed by a metaphorical "invisible hand", which is the hidden mechanism of the market economy action. In other words, market regulation is self-sufficient and can adjust individual rational behavior. Therefore, the issue of regulating the population' economic behavior was not raised in principle, i.e. the classical view of a man as an optimally functioning Homo economicus did not require building a system of socio-economic regulation of behavior.

The emergence and development of alternative economic concepts weakening the thesis of the rationality of human behavior has led to a transformation of the view of the state's role in regulating the population's economic behavior. The most well-known alternative view is the behavioral concept, according to which human behavior is influenced by emotions, thinking patterns, etc., and rationality is limited by the individuals' cognitive abilities to process incomplete and imperfect information [15].

In the economic, social, and psychological literature, there is abundant empirical evidence for deviations from rational behavior. For example, imperfect optimization: in some cases, people ignore information that would help them make the right decision [16]; in others, they initially consider poor financial decisions or for some reason refuse to choose the best options [17; 18]. Biased judgments or preferences have an impact. In particular, some people attach more importance to potential losses rather than the equivalent amount of potential benefits [19; 20]; to the current (short-term) rather than future (long-term) results [21; 22; 23], which leads to inefficient spending, borrowing or investing. The consumers' choice varies depending on the financial products and services, on how their offer is designed, and how their characteristics are presented [19; 24; 25]. The influence of the social context is also significant: consumers may trust financial advisors too much, not considering that the latter may be motivated by personal self-interest [26]; comparison with the success of others can make the consumer feel envy or frustrated and keep him or her from making a good choice [27].

Such observations led to the emergence of H. Simon's theory of "bounded rationality", the theory of perspectives by D. Kahneman and A. Tversky, R. Thaler's new behavioral economy, and other theories allowing state's intervention in the economic behavior of the population. Research by R. Thaler and K. Sunstein formed the basis of "Libertarian Paternalism", the policy of minimal intervention of the state in the person's choice [28; 29]. It is assumed that by conducting a minimally aggressive policy using special tools with psychological stuffing [30, p. 350] the paternalistic state helps people to make optimal decisions individually and socially, not hindering their achievement of subjective preferences and improving their well-being [14, p. 16–17; 31].

Along with the development of conceptual views of economic science, there is a transformation of "traditional" methods of regulation in politics (command-and-control, transparency-and-access), which show a decreasing effectiveness in regulating population's behavior [7, p. 8]. Knowledge about behavioral errors and ways to influence them are increasingly taken into account when developing regulatory effects on the behavior of the population. For example, "there are currently at least 20 nudge units in the world in Europe, America, Asia, and Australia" [32].

According to R.I. Kapelyushnikov, the logic of state regulation in the behavioral economy implies effective elimination of cognitive and behavioral errors of the population, direct restrictions on current irrational behavior and broad social support for future behavior. Traditional directions of state policy, on the contrary, assume regulation and control of the current economic behavior of the population with the help of future rewards or fines [11, p. 88].

Two general paradigms for population-wide behavior change have emerged in recent years – models that aim to change cognitions[5] (such as beliefs and attitudes) and models that change the context[6] (environment or situation)

[5] See: [33].
[6] *Ibedem*.

Figure 1. Description of MINDSPACE categories

M	Messenger	↔	We are heavily influenced by who communicates information
I	Incentives	↔	Our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
N	Norms	↔	We tend to do what those around us are already doing
D	Defaults	↔	We 'go with the flow' of pre-set options
S	Salience	↔	Our attention is drawn to what is novel and seems relevant to us
P	Priming	↔	Our acts are often influenced by sub-conscious cues
A	Affect	↔	Our emotional associations can powerfully shape our actions
C	Commitments	↔	We seek to be consistent with our public promises, and reciprocate acts.
E	Ego	↔	We act in ways that make us feel better about ourselves.

Source: compiled by the author on the basis of [33, p. 129–133].

within which the person acts [33, p. 126–127]. Their qualitative content occurs within the framework of a behavioral concept.

"Changing cognition" involves providing a person with new information in one form or another. Such interventions trigger reflexive mental processing and attempt to train the person to make more reasonable and effective decisions. The influence of information and education is consistent with the classical model of a rational person: the more information we have, the more likely we are to accurately calculate the payoffs for each decision and choose the best one. "Changing cognition" works best for those who are most open to informing, perceiving, and understanding new knowledge, so it can widen the gap between individuals with high and low levels of education. In relation to financial behavior, such interventions are intended to improve financial literacy, facilitate people's understanding of financial products and services, and the decision-making process itself [33, p. 127–128].

"Changing the context" takes more account of the fact that people have limited cognitive abilities. It involves influencing automatic judgment processes, focusing on correcting behavior without changing attitudes [33, p. 129–133]. In this case, a set of influences is used, which is often referred to as MINDSPACE in western practice (*Fig. 1*).

The consequences resulting from the use of the two lines of behavior regulation – "changing cognition" and "changing the context" – are currently an urgent topic of research by foreign scientists. For example, in the works of P. Dolan and etc. [33], B.C. Madrian and etc. [34] it was found that interventions such as "changing cognition" (based on education and new information) affect the financial behavior of mostly highly educated, financially literate

and receptive to new information people, and "changing the context" has a more universal effect and is suitable for people of different socio-demographic characteristics.

Generalization of behavioral economics tools (mostly interventions of the "changing the context" type) is presented in the works of K. Sunstein, R.I. Kapelyushnikov, A.E. Golodnikova, D.B. Tsygankov, M.A. Yunusova, and others. They consider the tools of behavioral "nudging" which are the most promising for public administration: establishing "default options"[7] [35, p. 19]; direct prohibitions restricting individual choice in high-risk spheres (for example, the prohibition on the abolition of state pension insurance); legislative consolidation of cooling-off periods (for example, when purchasing insurance products or expensive items); customer-oriented forms of information disclosure in case of transactions with high-risk products (mortgages, lending, etc.); sending text messages of various content[8] [7, p.12-14; 11, p. 84-88; 36].

Speaking about the experience of the population's behavior regulating through "changing cognition" and "changing the context", it is necessary to indicate those aspects that may limit their application in Russian practice. First, only a part of manifold combinations of different types of interventions and their effects have been studied, and mainly based on the experience of foreign countries. Therefore, preliminary research and experimental testing are necessary in order to avoid undesirable results and clarify the Russian specifics of "nudging" techniques. Second, specialized research should not only be conducted by scientists in limited samples. Large employers and the national government should be involved in the study of the issue, since they can work out regulatory policies for a larger population or for homogeneous categories of employees (military personnel, employees in the public sector or a certain industry). Third, for some people, the policy of external "nudging" may seem questionable in moral and ethical terms. The grounds for skepticism may be, for example, the restrictions on constitutional human rights to freedom of choice or manipulation by decision-makers in favor of their self-interest, rather than the interests of society as a whole. However, according to the methodical foundations of the "libertarian paternalism" by R. Thaler and C. Sunstein, the external "nudging" techniques do not make any restrictions in choice but create conditions for the person making decisions on a voluntary basis "so that these decisions were best for him" [28, p. 179; 35, p. 18-21][9]. Moreover, as noted above, state and

[7] For example, the policy on voluntary organ donation. In some countries (France, Poland, Hungary), the default option in medical wills is "I agree to be an organ donor". In other countries (the Netherlands, Germany), organs for donation cannot be used without explicit consent (i.e. you must indicate your own consent or non-consent).

[8] For example, in Australia, to encourage the tenants to pay their rent on time, they sent messages "containing behavioral incentives: social norms ("9 out of 10 tenants in your area paid their rent on time"), loss aversion ("Your rent is overdue. The lease agreement is under threat"), a message about the community's expenses ("Your rent is overdue. Unpaid rent costs the state and the community money that could be used to help people in difficult situations") and so on [7, p. 14].

[9] Let's look at the example of a "401 (k) plan" – employees' savings plan. The employer can choose one of two options – "automatic enrollment" or "choice". During "automatic registration", employees are explained that if they do not opt out, they will be enrolled in the plan; the form itself already states that the employee agrees to participate (there are default options for deduction rates and asset allocation), but there is a column for refusal (which the employee should fill out). An alternative "choice" option means that the employee should mark whether he or she participates or not (as well as determine the percentage of deductions and asset allocation).

The "automatic enrollment" option is truly paternalistic, meaning that employers acts as paternalists – they believe that participating in the employee's 401 (k) plan is beneficial to their well-being, so they direct the choice toward participation. But at the same time, the employer does not force the employee to participate, because even in case of automatic enrollment, the employee has the opportunity to choose not to participate by filling in a special box. I.e., there is no manipulation and restriction of the person's will or freedom of choice [28, p.176-177].

public "nudge units" developing "behavioral nudge technologies in different situations" have been operating since the early 2000s in foreign countries; in general, behavioral methods are used in public policy in more than 150 countries [35, p. 22].

Thus, the evolution of economic thought, management and political science and practice has indicated the limitations of the "normative" theory of rational choice (and other concepts based on it) for use in regulating the population's economic behavior. Rational choice is increasingly seen not as maximizing utility (profit) and minimizing costs, but as the best and most satisfactory of the available options. Alternative economic trends development (in particular behavioral economics) has shown that manager's task is to create such an environment to bring the decision made by a person to the best possible one in terms of maintaining a balance between social utility and individual well-being.

Regulation of the Russian population's financial behavior

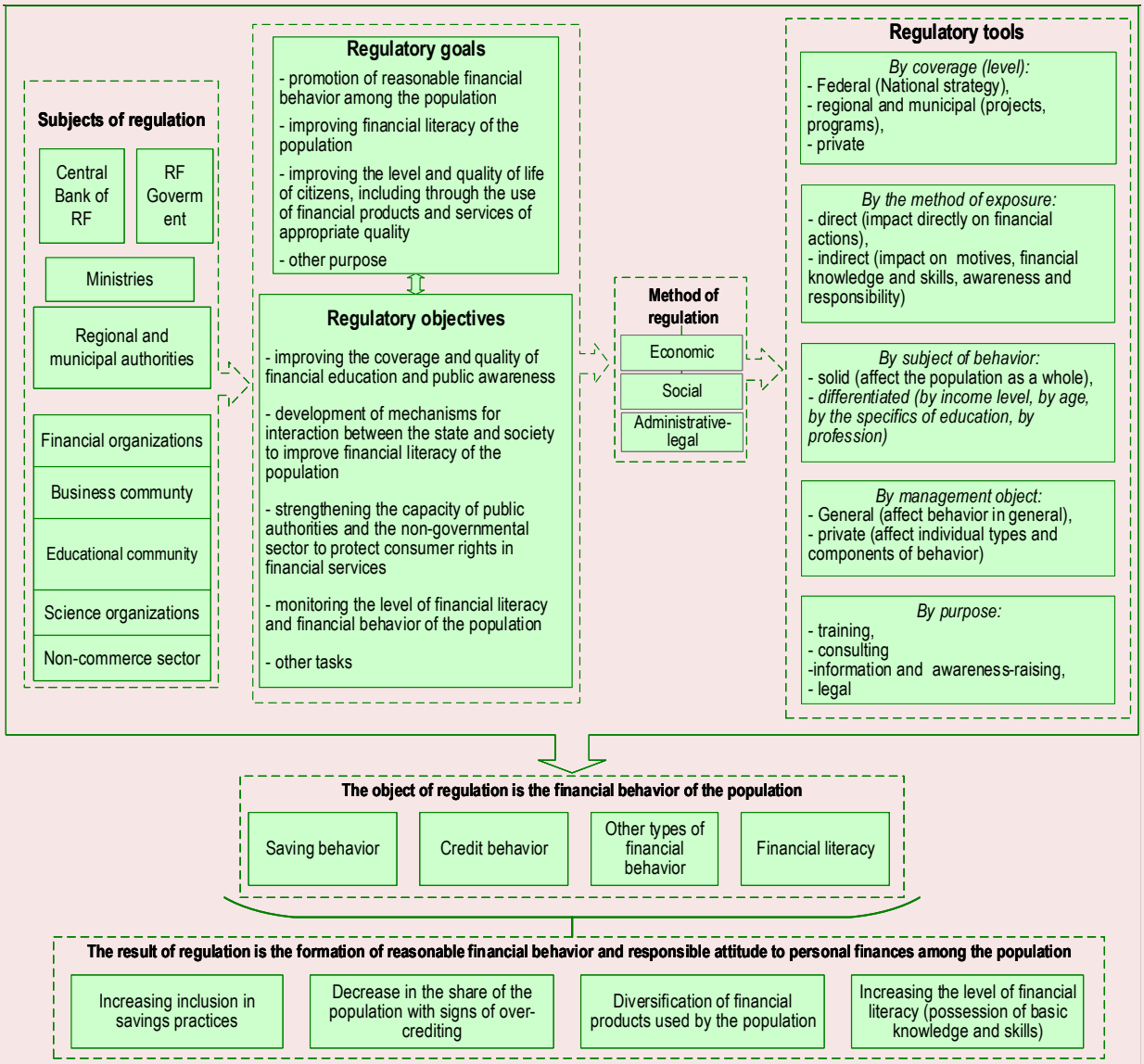
The formation of modern practice of regulating financial behavior of the Russians took place against the background of the transformation of public administration at the end of the twentieth century. The transition from the Soviet system of state paternalism to a liberal ideology and "insurance relations" between the state and the population caused the authorities to create conditions (including a regulatory and procedural environment) for the inclusion of the population in financial transactions and train them to work in conditions of risk, uncertainty and personal responsibility for their own material well-being.

Regulation of financial behavior of the Russian population is mediated by regulation of the financial market participants' activities. A generalized scheme of the process of regulating financial behavior of the population, which, in our opinion, is implemented in the Russian reality, is shown in *Figure 2*. Its *main coordinators* are the Government of the Russian Federation and the Central Bank of the Russian Federation. They define the "rules of the game", develop strategic and program documents that regulate relations arising when the population, financial and credit organizations, the state and other agents interact on the formation, distribution and use of monetary and other financial resources of citizens.

The Ministry of Finance of the Russian Federation, the Federal Service for supervision of consumer protection and human well-being, the Ministry of Education and Science of the Russian Federation and other federal executive authorities, executive authorities of the subjects of the Russian Federation and local governments, financial market institutions and other interested parties *also take part in regulating financial behavior of the population*. Their activities are regulated by the existing policy documents (Strategy for Financial Literacy in the Russian Federation for the years of 2017-2023, Development Strategy of the National Payment System, Long-term Strategy of Development of Pension System of the Russian Federation, Strategy of Development of Insurance Activity in the Russian Federation until 2020, Main directions of development of financial market of the Russian Federation for the period of 2019-2021, etc.) and other legal acts.

One of the priority goals for the development of the financial market is "improving the life level and quality of the citizens of the Russian Federation through the use of financial market

Figure 2. Scheme of the process of regulating the Russian population's financial behavior



Source: compiled by the author.

tools"[10]; then, the goals and objectives are built from it in relation to the financial behavior of the population (see Fig. 2). In particular, *the objectives of financial behavior regulation are*:

– promotion of reasonable financial behavior among citizens;

– universal improvement of financial literacy in all socio-demographic, professional, income and other groups of the population;

– ensuring consumers' availability of financial products and services of appropriate quality, using which contributes to improving the quality of life of the population;

– fair implementation of the legal norms established by the legislation in relation to all participants of the financial market, etc.

[10] Main development directions of the financial market of the Russian Federation for the period of 2019-2021 / Bank of Russia. Available at: https://www.cbr.ru/Content/Document/File/71220/main_directions.pdf

The objectives of regulating financial behavior of the Russians include:

– increasing citizens' involvement in financial education processes;

– development and implementation of public and private programs to improve financial literacy in socio-demographic, professional, income and other groups of the population (for example, classes for minors on the basis of comprehensive educational organizations, additional financial training for students of secondary and higher professional education institutions, classes with young families or socially vulnerable groups based on social assistance centers for families and children, "educational days" for specific groups of the population in financial organizations of various levels, including regional offices of the Central Bank of the Russian Federation);

– conducting regular monitoring aimed at investigating the involvement of the population in financial behavior, measuring the current level of financial literacy of people to assess the effectiveness of the ongoing activities and their timely adjustment, etc.

An appropriate concretization of the *final result of regulation of financial behavior*, in our view, is a variation of a goal from the project of the Ministry of Finance and the World Bank, "Enhancing financial literacy and developing financial education in the Russian Federation", namely *the formation of prudent financial behavior and responsible attitude to personal finance among the population*. The noted result can be specified for each type of behavior and financial literacy, for example:

– for saving behavior: increasing the population's involvement in legal savings practices; increasing the share of the population having three-month money reserves (i.e., a financial "safety cushion"), and so on.;

– for credit behavior: reducing the share of the population with signs of over-crediting; increasing awareness of the "right steps" to use loans, and so on.;

– financial literacy: increasing the share of the population in general and specific groups (e.g. families with children, low- and middle-income groups, etc.), leading the family budget; increasing the proportion of the population, comparing possible financial services and conditions of their provision; reducing the share of citizens who are not aware about the signs of financial pyramids and other forms of financial fraud and so on.

Next, let us consider some of the regulatory and procedural mechanisms used in regulating financial behavior of the Russians, which will allow us to trace the correlation between the paradigms of "changing the context" and "human change".

Savings and credit policies are the most developed areas of state regulation of the population's financial behavior. In practice, they are implemented in a variety of forms: change of the refinancing rate by the Bank of Russia, fiscal policy, public and private safety guarantee of deposits, the establishment of rules of interaction between credit and non-credit financial organizations with individuals, the introduction of bankruptcy procedures and so on (*Table 1*) [37; 38].

Several draft laws that may affect the financial behavior of the Russians in the future, including their decisions on savings and loans, are currently under development and preliminary consideration in the state Duma. Draft law no. 757296-7 "On amendments to certain legislative acts of the Russian Federation (in terms of improving the system of mandatory deposit insurance in banks of the Russian Federation)" proposes to increase the maximum

Table 1. Examples of mechanisms of state regulation in the field of savings and credit behavior of the population

Mechanism	Content	Regulation line
Bank deposit insurance system (DIS)	The state program for the protection of personal savings in Russian banks has been functioning since 2004, when the state Corporation "Deposit Insurance Agency" (DIA) was established. Depositors of banks who are DIS members are entitled to receive compensation up to 1.4 million rubles. (inclusive) in case of revocation of the bank's license (occurrence of an insurance event). As of the beginning of 2020, 720 participating banks are involved in the insurance system. During the existence of the DIS, 508 insurance cases occurred, and more than 1.5 million depositors received insurance compensation. The amount of compensation for deposits was revised repeatedly (4 times over 10 years), and over the entire period it increased 14 times – from 100 thousand rubles to 1 million 400 thousand rubles[11].	Changing the context
The system to guarantee the rights of insured persons in the mandatory pension insurance system	The system started functioning since 2014; it ensures the safety of the amounts received to the pension account and used for calculating the future pension of the insured person. There are 33 non-state pension funds participating in the system. During the system operation, there were no guarantee cases related to the cancellation of the license of the participating fund[12].	Changing the context
Federal Law no. 353-FZ "On consumer credit (loan)"[13]	Along with the basic rules, this law sets out additional obligations of banks that borrowers are usually unaware of, which include: • free servicing operations when receiving and repaying a loan; • free provision of information about the amount of current debt, payment schedule (at borrowers' request not more than once a month); • informing borrowers of their overdue loan debt (no later than 7 days in the manner specified in the agreement between the borrower and the financial institution); • prohibition on providing additional paid services that are not specified in the agreement with the borrower.	Changing the context
The indicator of borrowers' debt burden (IDB)	Since October 1, 2019, the Central Bank of the RF requires banks and microfinance organizations to calculate the IDB when deciding on granting a loan in the amount of 10 thousand rubles and more, and also encouraged them to inform the borrower about the IDB value. The calculation algorithm offers a definition of the ratio of the borrower's average monthly payments for all loans and credits to his or her average monthly income. This innovation does not prohibit creditors from issuing loans to citizens with a high IDB level. However, banks will be forced to form an additional capital reserve when lending to borrowers with IDB of more than 50 percent. This is not profitable, and consequently, the number of high-risk loans will decrease, and the growth rate of unsecured consumer lending will decrease[14].	Changing the context
Prohibitions on issuance of loans	Since October 1, 2019, a ban on providing mortgage loans to citizens by non-professional lenders, i.e. those who are outside the supervision of the Bank of Russia, has been introduced. Since November 1, 2019, microfinance organizations have been prohibited from issuing loans to citizens secured by housing collateral, even if it is not the only one[15].	Changing the context
Regulation of the penalties amount (fine, overdue interest)	Since January 1, 2020, according to Federal Law no. 554-FZ dated December 27, 2018 "On amendments to the Federal Law "On consumer credit (loan)" and Federal Law "On microfinance activities and microfinance organizations", it has been prohibited to charge interest, penalties (fines, overdue interest), payments for additional services under a consumer credit (loan) agreement issued for a period of one year or less, after the fixed amount of payments reaches one and a half times the amount of the credit (loan)[16].	Changing the context
Source: compiled by the author.		

[11] See: https://www.asv.org.ru/agency/

[12] See: https://www.asv.org.ru/pension/

[13] Federal Law no. 353-FZ "*On Consumer Credit (Loan)*", dated 21.12.2013. "Consultant Plus" reference and research system.

[14] Fast and contactless: the main financial surprises of the year. *Rossiyskaya Gazeta*. Special editorial project. Events of the year 2019. Available at: https://rg.ru/2019/12/02/bystroi ii beskontaktnoi glavnyei finansovyei siurprizyi goda.html (accessed: 17.01.2020).

[15] *Ibidem*.

[16] The most significant innovations in January. Available at: http://www.garant.ru/article/1312704/ (accessed: 17.01.2020).

level of compensation for bank deposits to 10 million rubles for the cases of short-term (no more than 3 months) storage of these funds in the citizens' accounts (when selling residential premises or land, receiving inheritance, receiving social payments and benefits, receiving grants in the form of subsidies, etc.)[17]. Another draft law no. 843962-7 "On amendments to the Federal Law "On consumer credit (loan)" (in terms of clarifying the procedure for concluding a consumer credit agreement (loan))[18] provides for the introduction of the obligation for lenders to disclose all the terms of lending directly in the consumer loan agreement, and also provides for a ban on the lender putting in a pre-printed form (in the form of "ticks" or other designations made in a typographic way) for the borrower to agree to the terms of lending without his / her own signature[19].

These draft laws provide the examples of "changing the context" paradigm. One of the mechanisms that presupposes an impact on both the context and the human is the legislative consolidation of the rules on *individuals' bankruptcy*. On October 1, 2015, the updated Chapter X "Bankruptcy of a citizen" of Federal Law no. 127 dated 26.10.2002 "On insolvency (bankruptcy)" came into force[20]. This measure was a response of the authorities to the situation with the increasing number of problem loans and insolvent debtors. Bankers received a new tool for working with such clients, and citizens became able to resolve difficult financial situations. However, the practical results are still ambiguous. According to Fedresurs (the Unified Federal register of bankruptcy information), over the four years of existence of the consumer bankruptcy mechanism, about 163 thousand Russians have used it, which is only 16% of potential bankrupts the number of which is about 1 million people in Russia. Most cases (more than 70%) end without compensation to the lender (for example, in 2019 only 8 billion rubles (or 3.5%) of claims out of 225.6 billion rubles were returned), mainly due to the fact that even at the entrance to the procedure, citizens do not have property that could be used for payments[21]. The bankruptcy procedure may seem time-consuming for the law-abiding citizens due to their insufficient financial knowledge, and it can become a way to avoid serious losses for the defaulters due to their moral characteristics. It turns out that this measure needs to be adapted to the unprepared banking organizations and the population[22].

State regulation of the process of *improving financial literacy of the population* deserves special attention. The issue of improving the Russians' financial literacy has begun to be addressed on a systematic basis since July 2011. Based on the results of many years of work, in

[17] See: Draft law no. 757296-7. The system for ensuring legislative activity. *Government of the Russian Federation*. Available at: https://sozd.duma.gov.ru/bill/757296-7 (accessed: 17.01.2020).

[18] See: Draft law no. 843962-7. The system for ensuring legislative activity. *Government of the Russian Federation*. Available at: https://sozd.duma.gov.ru/bill/843962-7 (accessed: 17.01.2020).

[19] Loan with no load. *Rossiyskaya Gazeta*. 05.11.2019. Available at: https://rg.ru/2019/11/25/v-gd-vnesli-zakonoproekt-o-zaprete-naviazyvat-zaemshchikam-uslugi.html (accessed: 17.01.2020).

[14] *On insolvency (bankruptcy)*: Federal Law dated 26.10.2002 no. 127-FZ. ConsultantPlus reference and search engine.

[15] Bankruptcy of citizens – Fedresurs statistics for 2019. *Fedresurs*. Available at: https://fedresurs.ru/news/390d0bea-3b00-4512-87a9-5d23fcabfb59 (accessed: 21.01.2020).

[16] It is reported that the Ministry of Economic Development has prepared a draft law on a simplified bankruptcy format (more on: How to benefit from bankruptcy. *Rossiyskaya Gazeta*. 22.12.2019. Available at: https://rg.ru/2019/12/19/proceduru-bankrotstva-mozhno-budet-prohodit-v-uproshchennom-poriadke.html (accessed: 21.01.2020)).

Table 2. Main provisions of the Strategy for improving financial literacy in the Russian Federation for 2017–2023

Provision	Contents
Strategy goal	Creating the basis for the formation of financially literate behavior of the population as a necessary condition for improving the citizens' level and quality of life, including through the use of financial products and services of appropriate quality
Target groups for priority work	- Students of educational organizations of different levels; - citizens of retirement and pre-retirement age, persons with disabilities; - low- and middle-income citizens
Minimum knowledge and skills of a financially literate citizen	- Monitoring the state of personal finances; - planning one's income and expenses; - creating long-term savings and a financial "safety cushion" for unforeseen circumstances; - having an understanding of how to search for and use the necessary financial information; - choosing financial services rationally; - living within one's means, avoiding debts and non-payments that are disproportionate to one's income; - knowing and being able to defend one's legal rights as a consumer of financial services; - being able to recognize the signs of financial fraud; - knowing about the risks in the financial services market; - knowing and performing one's duties as a taxpayer; - preparing financially for life in retirement
Strategy implementation results	- Accomplished infrastructure ensuring a continuous process of improving financial literacy of the population in the Russian Federation, - improving the quality of financial education and informing citizens about personal finance management, personal financial security, and consumer protection of financial services; - formation of a responsible type of behavior in the financial market and the acquisition of financial competencies by the population, including the implementation of long-term planning of personal finances (household finances) at all stages of life
Source: compiled by the author.	

September 2017, the "Strategy for improving financial literacy in the Russian Federation for the period of 2017–2023"[23] was developed and approved for implementation (*Table 2*). In many regions of Russia (Kaliningrad, Volgograd, Arkhangelsk, Kirov, Kaluga oblasts, Krasnodar, Altai, Stavropol krais, the Republic of Bashkortostan, Adygea, Tatarstan, etc.), regional strategies and programs are being implemented to improve financial literacy of the population. The Federal methodological network for financial literacy in comprehensive and secondary vocational education has been created to provide educational, methodological, informational and consulting services. Information and training events are held on a regular basis, such as regional and all-Russian conferences; competitions for school, student and journalistic works; all-Russian savings week; Family financial festival, etc. the work of network resources has been organized – the "Druzhi s finansami" ("Be friends with finance") website and newspaper, the Bank of Russia's information and educational resource "Finansovaya kul'tura" ("Financial culture"), the financial services consumer protection portal "Khochu. Mogu. Znayu" ("I want. I can. I know") and others.

These activities are aimed at both the "context" and the "human", but it is necessary to understand that such work is a multi-year process, the effect of which is possible with the mass inclusion of the population in the ongoing financial education activities and an adequate change in the financial environment itself.

[23] Strategy for improving financial literacy in the Russian Federation for the period of 2017-2023: approved by the order of the Government of the Russian Federation dated 25.09.2017 no. 2039-R. Russian Government. Documents. Available at: http://government.ru/docs/29441/

Table 3. Other mechanisms of state regulation of the population's financial behavior

Mechanism	Contents	Regulation line
Withdrawing credit institutions that do not meet the supervisory requirements of the macro-regulator from the market	Central Bank of the Russian Federation conducts a policy of discouraging organizations' unfair behavior in the financial market. In 2014-2016, the number of annually revoked licenses for banking operations was approximately the same (86 in 2014, 93 in 2015, 89 in 2016), in 2017-2019 it significantly decreased (47 in 2017, 64 in 2018, 27 in 2019)[24]. The total number of operating banks has decreased more than twice over 6 years – from 923 on January 1, 2014 to 442 at the beginning of 2020[25].	Changing the context
Development of key information documents (KID)	The development is carried out by the Central Bank of the Russian Federation together with financial market participants. The KIDs are the passports of financial products in the insurance segment, in the securities market, and in the banking sector. They will contain information about all conditions and possible risks for the consumer[26].	Changing the context
Cancellation of commissions	From mid-June 2020, according to Federal Law no. 434-FZ dated December 16, 2019 "On amendments to Article 29 of the Federal Law "On banks and banking activities", the commissions for interregional transfers of funds between bank accounts of individuals within one and the same credit institution (the so-called "Bank roaming") will be canceled in Russia[27]; a bill abolishing bank commissions on utility and mandatory payments is being prepared[28].	Changing the context
New mass financial products	Federal loan bonds OFZ-n (in the text); guaranteed pension plan (in the text).	Changing the context + the human
Source: compiled by the author.		

In addition to these interventions, other mechanisms for regulating the financial behavior of the population are being implemented, mainly related to changes in the environment (in the regulatory and procedural aspect) (*Table 3*).

The state's work on the development of financial products, through which it plans to gently involve the broad masses of the Russians in the capital market and simultaneously increase their financial literacy should also be mentioned. For example, *federal loan bonds OFZ-n* having been issued by the Ministry of Finance since 2017. "OFZ-n users are mostly middle-aged and older people. To expand the audience of OFZ-n users, the product was upgraded in 2019: the sales network was expanded up to four banks (Sberbank, VTB, Pochta Bank, Promsvyazbank), and sales via mobile and Internet applications were introduced. Experts note that attracting young people to buy "public" bonds ... will give

[24] Data from the Fingram portal. Available at: https://finagram.com/skolko-bankov-zakrylos-v-2018/ (accessed 21.01.2020); What Russian banks should be waiting for in 2020. *Rossiyskaya gazeta.* Special editorial project "Events of the year 2019". URL: https://rg.ru/2020/01/06/chto-zhdet-rossijskie-banki-v-2020-godu.html (accessed: 21.01.2020).

[25] Information about the banking system of the Russian Federation. *Central Bank of the Russian Federation*. Available at: https://www.cbr.ru/statistics/pdko/lic/ (accessed: 05.02.2020).

The Bank of Russia takes into account only existing credit organizations (442 institutions), while the DIA reports also take into account banks that have their licenses revoked, but CERs payments are made (720 institutions).

[26] People have become more literate. *Rossiyskaya Gazeta*. 14.01.2020. Available at: https://rg.ru/2020/01/14/reg-szfo/banki-rasskazali-kak-minuvshij-god-izmenil-povedenie-klientov.html (accessed: 05.02.2020).

[27] Bank roaming is canceled. *Rossiyskaya Gazeta*. 18.12.2019. Available at: https://rg.ru/2019/12/18/rg-publikuet-dokument-ob-otmene-bankovskogo-rouminga.html (accessed: 05.02.2020).

[28] There will be no commission any more. *Rossiyskaya Gazeta*. 29.11.2019. Available at: https://rg.ru/2019/11/29/bankovskuiu-komissiiu-po-platezham-za-kommunalnye-uslugi-zapretiat.html (accessed: 05.02.2020).

them real working experience with investment products and train them to plan a budget for the long term"[29].

The Ministry of Finance has been working on a draft law on a new product of the accumulative pension system – *the guaranteed pension plan (GPP)*. GPP will become a new type of pension scheme within the current system of non-state pension provision. It is assumed that the GPP as a standardized protected pension product will provide citizens with the opportunity to direct personal money to finance their retirement income with the state's incentive support, as well as protect savings from misuse. However, as first Deputy Chairman of the Bank of Russia Sergey Shvetsov noted in early January 2020, "this product will be of more interest to citizens with a monthly income of somewhere from 45 thousand rubles per person in a family. It is unlikely that those with less income will participate in this scheme, because they ... do not have many opportunities to cut their current consumption. This is a product for citizens who have sufficient financial literacy"[30]. It should be noted that an individual pension capital was earlier being developed which should have provided for employees' automatic "subscription", but it was transformed into the GPP, participation in which is voluntary, i.e. the employee should write an application to join this system. As we can see, the state has refused to use one of the methods of nudging, i.e. setting the default choice, in the new pension product.

In addition to the developing and introducing financial products and services, the Ministry of Finance and the Central Bank of the Russian Federation *regulate their current offer (i.e., the "context")*. A striking example was the intervention of the Bank of Russia in the implementation of investment life insurance services, which were offered under the guise of standard bank deposits. The organizations took advantage of both the "gaps" in the legislation and the inattention of the population when concluding contracts. As a result, the population did not receive increased incomes, and above that faced inconveniences with prior repayment. According to the instructions of the Bank of Russia[31], since April 1, 2019, insurers and their agents are required to warn customers about the main risks and essential terms of the contract when selling such complex products. This intervention has led to a significant reduction in the supply of deposits with investment life insurance. However, banks are currently actively promoting deposits combined with individual investment accounts and brokerage services. This situation clearly shows that in Russian society, "changing the context" is a posteriori and does not always lead to the consolidation of competent financial practices among the population.

Thus, the state regulation of financial behavior of the Russians (in the regulatory and

[29] The people of the state debt. *Rossiyskaya Gazeta*. 01.02.2020. Available at: https://rg.ru/2020/01/28/eksperty-rasskazali-chto-vygodnee-vklad-v-banke-ili-narodnye-obligacii.html (accessed: 13.02.2020).

[30] See: Plan B for a better life. *Rossiyskaya Gazeta*. Special project. Available at: https://rg.ru/2020/01/12/v-cb-rasskazali-komu-podojdet-novaia-shema-pensionnyh-nakoplenij.html (accessed: 13.02.2020); the Ministry of Finance will submit a draft law on a new pension scheme to the government. *Rossiyskaya Gazeta*. Special project. Available at: https://rg.ru/2020/01/14/minfin-vneset-v-pravitelstvo-zakonoproekt-o-novyh-pensiiah.html (accessed: 13.02.2020).

[31] Instruction of the Central Bank of the Russian Federation no.5055-u "*On minimum (standard) requirements to the conditions and procedure for implementing voluntary life insurance with the requirement of periodic insurance payments (rent, annuities) and (or) with the participation of the an insured person in the investment income of an insurer*", dated 11.01.2019. The Central Bank of the Russian Federation. Available at: http://www.cbr.ru/Queries/UniDbQuery/File/50883/791.

procedural aspect) is mainly aimed at "changing the context", namely, at building a stable, fair institutional financial environment in which competitive, law-abiding financial organizations operate, providing the population with the most open and clear products and services. However, the development and adoption of certain legislative norms that form the context of the activities of financial organizations are often the reaction of authorities to the existing problems or mistakes made by the population. The impact of the paradigm of "changing the human" (personal beliefs, attitudes and skills) is only gaining strength, mainly through the measures to improve financial literacy and the introduction of new mass financial products.

Conclusion

Most of the aspects of regulating financial behavior of Russians mentioned in the article change the financial environment (in terms of legal and procedural aspects) in which a person acts. They either limit the unfair actions of financial organizations, or try to simplify and optimize the consumer's choice as much as possible. However, in Russia, these "interventions" are implemented in a slightly different way than behavioral "nudging" in foreign countries. It can be noticed that in Russia, a person perceives the environment passively – the "rules of the game" are changed by the legislator (i.e. the state), and a person only needs to be informed about these innovations, and not make an active choice. Even the specialists of the Center for Strategic Research, studying the regulatory policy of this country and forming proposals and specific algorithms for its improvement, only mention the use of behavioral regulation approaches, regardless of the population, while the main focus is on eliminating the "redundancy" of legislative acts and reducing legal barriers to business functioning[32]. Only in relation to some aspects of the regulation of the financial behavior in Russia requires the active choice of the person. For example, in the field of financial literacy and financial education, requiring the citizens' direct involvement in the ongoing activities. Another example is the pension system: the pension schemes and tools offered by the state are always linked to the personal will of citizens in resolving the issue of pension provision.

There is no doubt that in order to effectively regulate the financial behavior of the Russians, it is not enough to solve the issue of funds for working in the financial market, i.e. to ensure a steady increase in income and material well-being of the population as a whole. It is also necessary to increase the loyalty and level of trust of the population to financial organizations, improve the availability and clarity of financial products themselves, and reduce possible risks in the course of interaction between the population and financial organizations.

The results of the study show that the Russian government, implementing a policy to regulate the financial behavior of citizens, affects these aspects by building the "context" (the regulatory framework of the financial system), allowing a bias towards the person's "passivity". Thus, we can say that it works by trial and error (a long–term reform of the pension system can provide confirmation), without a thorough study of the conceptual foundations (for example the adaptation of the provisions of behavioral economics and the "nudging" mechanisms to the Russian conditions). In this regard, among other things, the decisions taken are often not adequate

[32] Regulatory policy in Russia: main trends and architecture of the future: report. A.E. Golodnikova [et al.] Center for Strategic Research; *HSE Moscow*, 2018. Available at: https://publications.hse.ru/books/219490252 (accessed: 22.01.2020).

to the material, cognitive and behavioral capabilities of the population (in particular, OFZ-n and GPP, according to many experts, are designed for people with high income and financial literacy), and sometimes are late (for example, instructions on complex bank deposits). Therefore, the elimination of the identified imbalance between the changes in the regulatory and procedural aspects of the financial context and the human (his/her knowledge and attitudes) should be taken into account by decision-makers to improve the effectiveness of regulating the Russians' financial behavior. In our opinion, the authorities should gradually change the regulatory vector from creating an "ideal" financial environment to creating a thinking and active, financially literate citizen. In this case the population will shape the demand for legitimate and competitive financial products and services on their own, and the unfair financial organizations and fraudulent schemes will be eliminated in the course of "natural economic selection".

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Social Policy in a Multi-Regional Agent-Based Model*

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Abstract. In the modern scientific and technological development, the role of the welfare state and the importance of solving the problem of inequality as a manifestation of social injustice is increasing. The purpose of the work is to develop a spatial agent-based model (ABM) in the direction of a detailed representation of social transfers block and the study of the economic agents' behavior in response to the changes of the state's social policy parameters. The isoelastic function of social welfare (FSW), which is based on the households' utility functions with correction factors reflecting the degree of social insecurity, is used to include ethical considerations in the economic analysis and formalize the goals for social justice. The novelty of the work is associated with the study of the dependence on different variants of the benefits structure, taking into account the agents' heterogeneity. The proposed ABM takes into account five main types of monetary transfers: pensions, unemployment benefits, child benefits, poverty benefits, and other

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social transfers. In addition, the experimental calculations consider two additional social benefits: the proportional transfer and basic income. The experimental calculations results show that social benefits are quite successfully integrated into the original ABM, and the main effects of these benefits are fully manifested in it. The relative characteristics of individual benefits differ significantly from the point of view of certain concepts of social justice and the corresponding changes in the FSW. By the example of the ratio of child benefit to the poverty benefit, it is shown that the effect in terms of the FSW at high levels of inequality rejection is achieved only through the complex use of transfers.

Key words: state's social policy, function of social welfare, social justice, public goods, social benefits, agent-based modeling.

1. Introduction

In the modern scientific and technological development, the role of the social welfare state and the importance of solving the problem of inequality [1] as a manifestation of social injustice is increasing[1]. At the same time, moral, ethical and value issues are constantly in the spotlight. Since the middle of the last century, the importance of "ethically-oriented" tradition in the economic science has been increasing, according to Sen's formulation [2, p. 17]. This is also evidenced by the spread of a new term designating economic theory as a "moral science" [3; 4].

The approach of social justice in economic analysis that was widely adopted in the middle of the last century, focusing on the redistribution of income and wealth through government intervention, has retained its significance in the new Millennium (see, for example, [5; 6]). A disturbing picture of social inequality and injustice consequences is drawn by the Nobel prize-winning author, J.D. Stiglitz: "We are, in fact, paying a high price for our growing and outsize inequality: not only slower growth and lower GDP but even more instability" [7, p. 14]. The theories of the public sector and Welfare State [8; 9] suggest a variety of social policy measures reducing inequality through a certain combination of taxes and transfers (see, for example, [10; 11]).

The development of economic and mathematical tools allowing to obtain quantitative estimates of changes in social priorities and the formation of appropriate social redistributive policies remains an unsolved problem. The proposed article takes a step towards its solution based on the application of an agent-based approach creating wide opportunities for computer modeling of the autonomous agents' behavior. The purpose of the work is to develop a spatial agent-based model (ABM) in the direction of a detailed representation of social transfers block and the study of the economic agents' behavior in response to the changes in the structure of social benefits as a component of the institutional environment. The novelty of the proposed approach is related to the experimental study of the function of social welfare depending on a wide range of social transfers, taking into account the agents' heterogeneity (heterogeneity in property ownership and resulting heterogeneity in income, distribution of households by the number of children, and other important differences in households' characteristics). Such tools allow to model the individual household's social vulnerability.

[1] *The World Inequality Report 2018. World Bank, 2018.* 157 p.

2. Redistributive and social policy in agent-based models

Modern economic ABMs along with private agents (firms and households) take into consideration two groups of government agents: state-owned enterprises (organizations, institutions, or agencies) providing different public goods at the microeconomic level, and governments of appropriate levels of the budget system and extra-budgetary funds, carrying out economic policy at the macro and meso levels (a more detailed overview of the existing government modeling approaches in ABM is presented in [12]).

A group of models originally created within the framework of the Eurace project at seven European universities should be mentioned among the foreign ABMs including a fairly detailed representation of the state [13]. In the future, other models were developed on the same platform, in particular Eurace@ Unibi [14]. The model's authors note that the government involvement is associated with redistributive functions and appropriate social policy. Social spendings of the expanded government include unemployment benefits and "various transfers and subsidies to firms and households, which can be used or not depending on the experiments on the policy option under study" [14, p. 38]. In most other foreign macro-economic ABMs, government transfers are limited to unemployment benefits only, for example, in such well-known models as ASPEN [15], Lagom [16; 17].

Spatial ABMs usually represent the government through the division of various levels of the budget system. In the work of Tsekeris and Vogiatzoglou [18], the decision-making of different governments is carried out in accordance with different FSWs. In contrast to the traditional dependence on utility functions, the FSWs proposed for the central government depend on the overall efficiency and territorial equity of the cities, and those for local governments depend on the performance indicators of urban development in the relevant territory and the local residents' well-being.

Among Russian ABMs, the government is represented in a more detailed way, including social organizations and expanded governments that implement social policy at various levels of the budget system. First of all, this applies to the work of a group of researchers from the Central Economic and Mathematical Institute of the Russian Academy of Sciences led by the Academicians V.L. Makarov and A.R. Bakhtizin (see, for example, [19; 20]). The spatial aspect of economic ABM is developed by the research team of the Institute of Economics and Industrial Engineering, Siberian Branch of the Russian Academy of Sciences under the leadership of V.I. Suslov, who proposed an agent-based input-output multi-regional model, first taking into account only private agents [21], and then including the government [12]. The article presents this model's development taking into account redistributive social policy.

In the study of A.R. Bakhtizin [20], the government is considered in the framework of a hybrid model that combines not only ABMs, but also the calculated models of general equilibrium and neural networks. At the same time, the united government is singled out as a separate agent, forming expanded budgets at all levels and spending on state final consumption. The provision of goods and services by this agent is generally characterized by non-competitive (as a defining feature of public goods), but this important feature is not taken into account in the model.

The level of municipalities in the region is studied in the work of V.L. Makarov, A.R. Bakhtizin, E.D. Sushko [22]. The organizations

in the fields of education, health care, science and public administration are identified in the proposed ABM as separate agents and are financed from the municipal budget in accordance with the budget security standards. In the considered ABMs, the government uses collected taxes for the solving efficiency problems and the corresponding financing of state-owned enterprises (social organizations), forming the government final consumption. However, the non-competitive property of goods provided by these enterprises is not taken into account. Thus, at the model level, the issue of making effective endogenous decisions in the public sector remains open.

Let us consider the approaches to accounting for the government redistributive policy in agent-based models in more detail. Despite the potentially wide range of policy directions outlined above in the Eurace@Unibi model [14], the main research in the field of government intervention is connected with direct stimulation of economic growth. For this purpose, only two specific types of transfers are proposed to use: subsidies for employees' training and investment subsidies to firms. In later versions of the model, the spatial aspect is taken into account on the example of different variants of technological policy. In [14], a community from two regions that differ in the level of technological development is studied. Targeted subsidies are provided to the firms in developing regions to finance investments in physical capital and purchase high-tech investment goods. The total amount of subsidies is financed from the community's general funds, which are formed from regional contributions in proportion to their GDP. Along with the subsidies to firms, the transfers to households are also taken into account, and in this case the positive effect of technological policy is enhanced [23].

The problems of inequality in agent-based models are also considered in a direct relationship with the levels of economic development. The paper [14] was one of the first publications that examines the mechanisms of various types of inequality, including not only income and wealth, but also the characteristics of the labor market, education, health care, migration and gender factors, with an emphasis on the relationship between technological changes and the level of personnel qualification. Almost simultaneously, a paper on modeling the relationship between income inequality and financial instability was published [17]. It shows that different variants of income distribution (between profit and wages) significantly affect macroeconomic indicators. At the same time, the government fiscal policy is quite effective, especially when income is redistributed in favor of profit in comparison with wages. We should note a fairly simplified representation of fiscal policy, in which government spending is directed only to the payment of unemployment benefits. In general, there is a tendency to increase the importance of moral and ethical priorities and the corresponding redistributive social policy, in this regard, the relevance of research using agent-based models is also increasing.

3. Agent-based multiregional input-output model (ABMIM)

3.1. General model structure

The ABMIM model identifies five main groups of agents: households, private and state-owned enterprises, governments at different levels of the budget system, and the Pension Fund. At the micro-economic level, there are three main groups of agents: households consuming private and public goods and supplying labor, firms producing private goods, and public enterprises producing public goods.

A variant of the spatial multiregional input-output model used in experimental studies of social policy includes three regions (West, East, and Center), 300 households, 150 firms (when forming production and technological sets and processing information, combined into four industries for the production of private goods), one generalized state enterprise responsible for transport services, and one generalized state enterprise, producing one type of public goods and corresponding the industries with the numbers 52-56 of the Russian Classification of Products by Economic Activities of the input-output balance of RF (including public administration and military security, education, health and social services).

At the macro- and meso-economic levels, the government is represented by a group of agents including federal and regional governments, as well as the Pension Fund. Thus, government agents' task is to ensure both economic efficiency and social justice. In this study, regional governments and regional public goods were not included in the current version of model.

In the following, we will briefly consider the components of the proposed model related to the implementation of social policy[2].

3.2. Households modeling

The utility function of each household $h = 1, ..., H$ consists of two groups of terms related to the consumption of private goods in volume x_{ih}, $i = 1, ..., N$, and public goods in volume g.

The Cobb-Douglas functions were used as utility functions in our model (the more general ABMIM model assumes the use of the more general CES function). The initial utility is multiplied by a reduction coefficient θ_h taking into account the characteristics of households in terms of family composition and social assistance needs:

$$U_h(x_{1h}, \dots, x_{Nh}, g) = \\ = \theta_h \cdot exp\left(\sum_{i=1}^{N} k_{cih}\, ln(x_{ih}) + k_g\, ln(g)\right). \quad (1)$$

The coefficient for the utility function θ_h can be interpreted as the degree of insecurity (more precisely, the non-monetary component of social insecurity). If $\theta_h < 1$ and all other things being equal, such a household requires a higher income to achieve the same level of utility as at $\theta_h = 1$.

In the case of child allowances, they differ for families with one child, two, three or more children. Households with the exception of pensioners were divided into four groups: childless, with one, two, three or more children. The number of the corresponding households and the ratio of payments in each group were set based on real statistical data in Russia for the year of 2015[3]. As a result, the distribution into four groups was obtained. The calculations for each of the four groups use the corresponding decreasing coefficients θ_h, which are equal to one for childless families and less than one for other groups of families in an increasing degree when the number of children in them increases.

Besides, the coefficients θ_h for some households were lowered even further to reflect the health problems of family members and other adverse factors. In the case of other social benefits, they reflect differences in the potential need to provide funds for medical expenses, health resort treatment, payment for individual utilities, material assistance, and other transfers supplementing social insurance payments. Decreasing coefficients are taken into account in the state's behavior when providing child benefits and social assistance.

[2] The source ABMIM model is analyzed in more detail, for example, in [21], a later variant of the model taking into account the State's activities is presented in [12].

[3] *Social status and standard of living of the Russian population. 2017:* stat. coll. M.: Rosstat, 2017. 332 p.

Families of pensioners and the unemployed are set apart as separate households along with the families of the working population. They receive corresponding transfers from the Pension Fund and the Federal budget.

3.3. Government modeling

State-owned enterprises provide the production of public goods, as well as transport services, in the current version of the model. Like private firms, their production capabilities are described by Leontief-type production functions, and they present a corresponding demand for labor, capital, and private goods used in production. The product price is set at a level providing a fixed margin level above the costs, which includes capital expenditures for maintaining production capacity. As a result of the margin, state-owned enterprises receive profit, which is then transferred to the budget.

Pensions in the model are paid by the Pension Fund by means of insurance contributions. The Pension Fund's income is fully spent on pension payments, so the Pension Fund's budget includes income equal to expenses and no inter-budget transfers are required. Pensions are paid in accordance with the certain fixed proportionality, which are responsible for pay differentiation. A random distribution of coefficients is used, which models the existing variation in the pensions size.

The government is implementing the state policy due to a combination of budgetary expenditures and revenues. Budget expenditures E consist of two parts:

$$E = G + S. \quad (2)$$

Here G is the government expenditures on final consumption, which are formed as a result of purchases of public goods g from state enterprises (at a price p_g):

$$G = p_g g. \quad (3)$$

The government also provides transfers S to private agents. Such transfers can be used to redistribute income and wealth and, ultimately, achieve social justice goals. In this study, we will look at this part of the government activity in more detail.

Government revenues R are generated in the model from the profit of state-owned enterprises B and taxes T: income tax, profit tax, VAT and payroll tax. Budget deficits are not taken into account in the considered versions of the model, the planned level of income is limited to tax receipts and profits of state enterprises:

$$R = T + B. \quad (4)$$

At this modeling stage, we use the simplifying assumption that the budget deficit was not considered, so the condition $E = R$ was met.

3.4. Social transfers modeling

The main variants of this model take into account five main types of social transfers in monetary form:

$$S = S_s + S_u + S_c + S_p + S_a, \quad (5)$$

where S is total social transfers, S_s – pensions, S_u – unemployment benefits, S_c – child benefits, S_p – poverty benefits, S_a – other social transfers.

Since pensions pass through a separate balanced budget in the model, this aspect of the government activity is not considered in detail in the article. The social spending S_x for each benefit x ($x = u$, c, p or a) is a fixed amount β_x of public expenditure E and is then distributed between different households $h = 1, ..., H$:

$$S_x = \beta_x E = \sum_{h=1}^{H} S_{xh}, \quad (6)$$

where S_{xh} is the benefit of type x provided to household h.

The solution of social problems is connected not only with the volume of allocated funds, but also with the nature of their distribution among those in need. The main principle of social transfers distribution in the model is as follows. Each household h is characterized by a non-negative differentiation coefficient C_{xh}, according to which it should be paid a transfer of type x. If the household is not entitled to this payment, then $C_{xh} = 0$. Accordingly, the amount of money S_{xh}, that a household h receives is equal to:

$$S_{xh} = C_{xh} S_x / \sum_{j=1}^{H} C_{xj}. \quad (7)$$

Let us look at the features of the main social transfers.

Unemployment benefits are distributed equally among the respective households. Thus, $C_{uh} = 1$ for the unemployed and $C_{uh} = 0$ f or the rest. If H_u is the total number of the unemployed, the amount of the benefit paid (for those who are entitled to it) is equal to:

$$S_{uh} = S_u / H_u. \quad (8)$$

Maternity and child benefits are allocated only to families with children and vary depending on the number of children. Households with the exception of pensioners are divided into four groups by the number of children. These benefits are not paid to the first group of childless families, as well as to pensioners, i.e. $C_{c,h} = 0$. The amount of the benefit for the second group of families with one child serves as a base, i.e. $C_{c,h} = 1$. When the number of children increases, monetary payments to families increase and remain until the child reaches the age of three (*Table 1*).

Poverty benefits are calculated on a slightly different basis (i.e. formula (7) is not used). For household h, the transfer value is

$$S_{ph} = \max\{Inc^* - Inc_h, 0\}, \quad (9)$$

where *Inc** is the stated minimum income level ("poverty line"). The value *Inc** is set so that the total poverty benefits are equal to the specified amount:

$$S_p = \sum_{h=1}^{H} S_{ph} = \sum_{h=1}^{H} \max\{Inc^* - Inc_h, 0\}, \quad (10)$$

Other social transfers are calculated in the same way as child benefits *(Table 2)*. The households were divided into ten equal-sized groups, distributed in ascending order of the corresponding payments, and then normalized so as to obtain a total value of the payout ratios equal to 10.

Table 1. Initial data on child benefits

Number of children	1	2	3
Share, %	15.6	14.9	3.5
θ_h	0.667	0.500	0.400
C_{ah}	1.000	2.194	3.292
Sources: authors' calculations; Social status and standard of living of the Russian population. 2017: stat. coll. M.: Rosstat, 2017, 332 p.			

Table 2. Initial data on other social benefits

Group no.	1	2	3	4	5	6	7	8	9	10
Share, %	10	10	10	10	10	10	10	10	10	10
θ_h	0.5	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
C_{ah}	2.81	1.87	1.51	1.20	0.94	0.70	0.50	0.31	0.15	0.00
Source: authors ' calculations.										

In addition to the basic benefits listed above, the experimental calculations considered two additional transfers allocated to households after deducting pensions and unemployment benefits from the funds allocated for social policy: pseudo- benefit and universal basic income.

Pseudo-benefit (S_f). For comparability of calculations, the initial variant of the model includes a money transfer distributed among the households in proportion to their income. If we use the definitions of formula (8), then for this transfer we should take $C_{fn} = Inc_h$, where Inc_h is the amount of income of the h^{th} household before receiving the benefit.

This distribution principle corresponds to the principle of tax neutrality, when the government collects money, but does not spend it for social purposes, and simply gives it back to the economy in a way that distorts the economic incentives for agents to a minimal extent. In particular, neither the income structure nor the Gini coefficient changes after such a transfer. It does not reduce economic inequality, and cannot be called social in the usual sense.

Universal basic income (S_b). In this type of social support, each household is guaranteed to receive a certain amount of money without checking the need or any additional conditions. Thus, this type of transfer is based on the rejection of social support selectivity principles and is widely discussed both in theory and in practice (see, for example, [24]). If we use the notation of formula (8), we can simply set $C_{bh} = 1$ for any household h. Unconditional basic income does not take into account the differentiation of the families' material situation, but it is more significant for the poor than for the rich, since it makes up a higher share of total income for them. Therefore, payments of this benefit correspond to the traditional ideas of social justice and reflect the trend of expanding social benefits, regardless of the differences in the initial position of the recipients observed in recent years.

The additional transfers considered are included in the total amount of social transfers, along with those that were included in it earlier in formula (5).

3.5. Economic indicators for assessing social policy

The modeling of budget and social policy choice in our study is carried out in accordance with a modified variant of the isoelastic function of social welfare (FSW) which depends on the values of the utility function of individual households:

$$FSW = \left(\frac{1}{H} \sum_{h=1}^{H} U_h^{1-\nu} \right)^{1/(1-\nu)} . \qquad (11)$$

This FSW is the power mean of individual utilities with a degree $1-\nu$, where $\nu > 0$. The value ν can be interpreted as the coefficient of inequality rejection. If $\nu = 0$, FSW is equal to the arithmetic mean of the utilities, which corresponds to the utilitarian (Bentham) criterion reflecting distributional indifference. In the limit if $\nu \to 1$, this is the geometric mean, which corresponds to the Bernoulli-Nash criterion. If $\nu = 2$, this is the harmonic mean. In the limit if $\nu \to \infty$ the formula gives the minimal value, which corresponds to Rawls' criterion. Thus, changing the parameter of ν in the limits from 0 to infinity allows us to formalize the entire range of representations of justice from the utilitarian to the Rawls' ones.

The model uses *the Gini coefficient* to monitor income inequality in the population. Let us assume that Inc_h is household's h income ($h = 1, ..., H$), and r_h is the rank of this income in ascending order (i.e., the lowest income is assigned rank 1, and the highest one – rank H). Then the Gini coefficient is by definition equal to:

$$\sum_{h=1}^{H} (2r_h - H - 1) Inc_h \Big/ \left(H \sum_{h=1}^{H} Inc_h \right). \qquad (12)$$

A coefficient value close to zero means that income is distributed evenly. Here we should be aware that income inequality is not the same as inequality in levels of wealth and living conditions. There may be people with an average income level, but with a low level of well-being in a society (for example, due to health problems or high prices in the place of residence).

4. Experiments with social transfers

4.1. Experimental calculations scheme

The considered isoelastic FSW is proposed to be used for choosing the optimal budget and social policy when studying the consequences of changes in the share of various social transfers (and in the future, tax rates). When constructing this function, we take into account the composition of families and the decrease in utility with the probability of unfavorable social circumstances.

The following approach was used in the study to measure the effects of various alternative social policy options and to ensure comparability of the corresponding variations of experimental calculations. First, the tax rates in all variants remained unchanged. Second, the overall share of transfers in budget expenditures was maintained at a constant level, so that the structure of budget expenditures remained unchanged in terms of the ratio of transfers and purchases of public goods.

As a starting point for the experiments with benefits, the authors considered a case when the government pays only two transfers: unemployment benefits (5% of expenditures) and pseudo-benefits (25% of expenditures). The remaining budget expenditures are allocated to the public goods purchase. Then, from option to option, the pseudo-benefit is completely or partially replaced with one of the rest social benefits. The effects of such substitution are analyzed by various indicators, primarily by the FSW size with different coefficients of inequality rejection.

In experimental calculations, a static version of the model was used, when production capacity and other initial parameters of the economy are at the same level. Within a single run (300 model periods), after a rather large number of periods, the model comes to a state of quasi-equilibrium, for which we can find the values of the economic indicators characterizing the results of economic policy.

4.2. The main results of the calculations

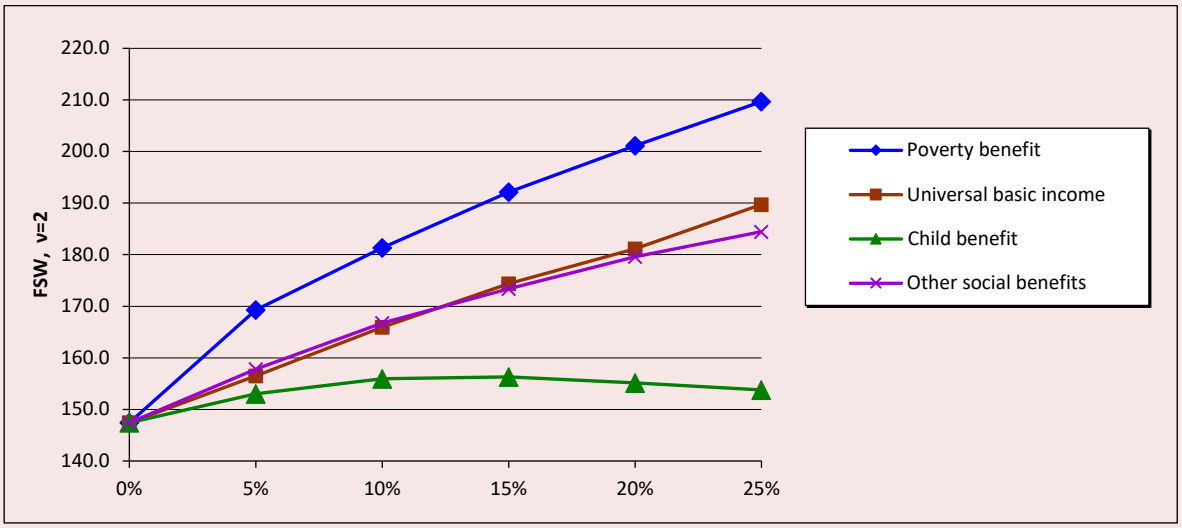
The results of the experiments are shown in a series of diagrams *(Fig. 1–4)*. All graphs reflect the dependence of one of the resulting indicators on the share of expenditures for one of the four benefits.

As you can see, the FSW with the parameter $v=2$ increases as the share of three social benefits increases (*Fig. 1*). This effect does not work with a large share of the benefit only for child benefits. The FSW growth shows that social benefits are really useful from the society's point of view as a whole, if the society strives for social justice and assistance to socially vulnerable citizens.

In the FSW diagram with the parameter $v=0$ (*Fig. 2*), we see that the poverty benefit and the universal basic income, which are reduced to a net income redistribution, are neutral in terms of the impact on public welfare, since the society here is indifferent to inequality, its goals are purely utilitarian.

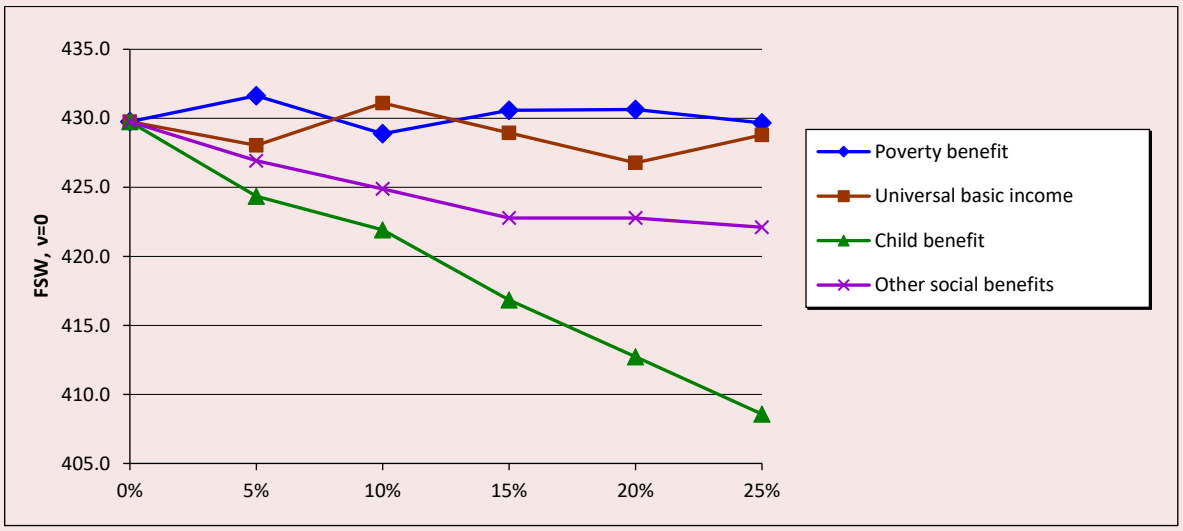
For other social benefits and child benefit, there is an effect of the utilitarian FSW fall. This phenomenon is explained by the fact that these benefits redistribute income in favor of those having a low coefficient of utility. The ruble transferred to such households gives a smaller increase in utility than the ruble transferred to households with a coefficient equal to one. Thus, from a purely utilitarian

Figure 1. FSW if $v = 2$, depending on the specific weight in costs



Source: authors' calculations.

Figure 2. Utilitarian FSW ($v = 0$) for four benefits, depending on the specific weight of each benefit



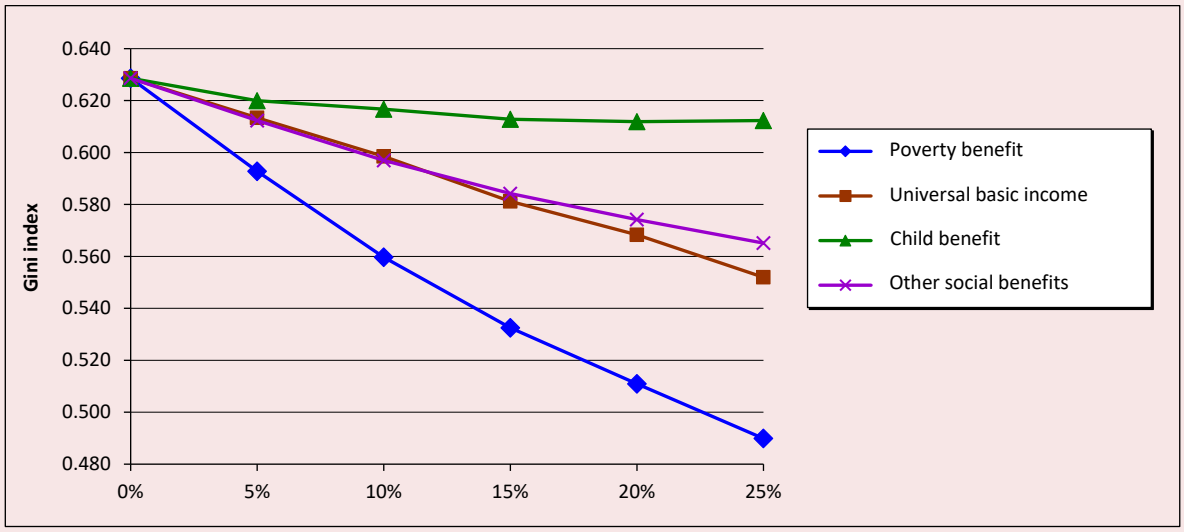
Source: authors' calculations.

point of view, society should not help socially unprotected citizens.

Further, as shown in *figure 3*, all benefits slightly reduce the Gini coefficient, which is a measure of income inequality. With low incomes, the lower the household's income, the higher is the amount of the poverty benefit, so the effect of this benefit on the Gini coefficient is very strong; this benefit is aimed specifically at reducing inequality. The size of the other three benefits does not depend on household's income, so they equalize income to some extent when compared with pseudo-benefits, but not as much as the poverty benefit.

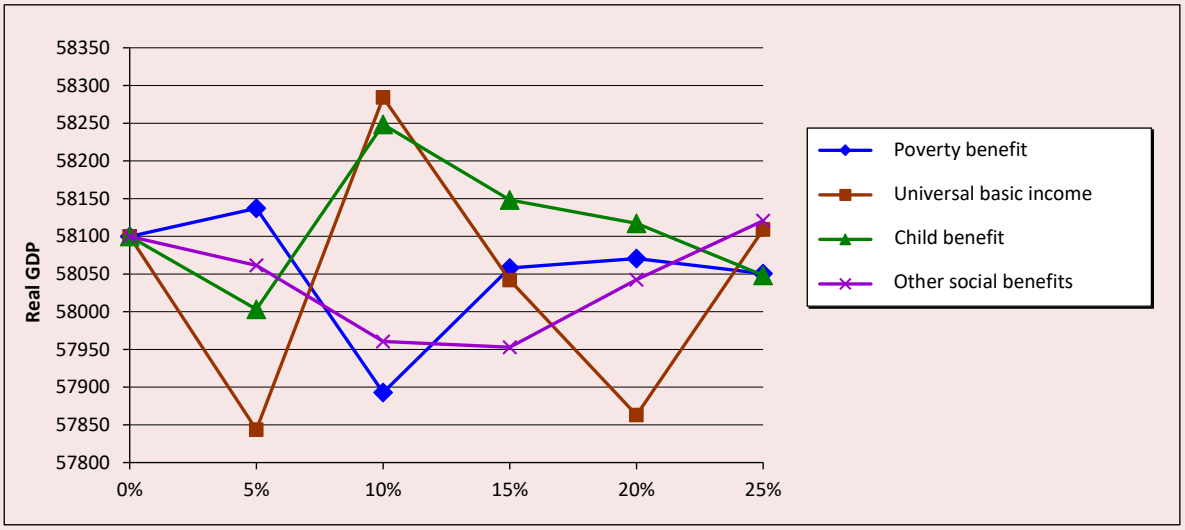
Finally, *figure 4* shows that the increase in the share of social benefits has almost no effect

Figure 3. Gini coefficient for four benefits depending on the share of the benefit in expenses



Source: authors' calculations.

Figure 4. Real GDP depending on the benefit's share in the expenditures



Source: authors' calculations.

on the GDP value. GDP fluctuations in the experiments were random, and the fluctuations size is not very large. This indicates that the scheme of our experiments was chosen correctly. Changes in the economy with the introduction of social benefits resulted mainly in the redistribution of the product between households in favor of the needy, without affecting the size of the product itself.

The conducted analysis makes it possible to compare the poverty benefit and the universal basic income. In terms of reducing inequality and increasing the non-utilitarian FSW, the poverty benefit works more purposefully and is the preferred option. Thus, the use of the universal basic income should be justified by some other considerations involving effects that go beyond the scope of our ABM.

4.3. Experiments with inequality rejection

In previous experiments, we considered isoelastic FSW only if $v = 0$ and $v = 2$. Let us now conduct a more detailed analysis that reveals the role of the parameter v in choosing the benefits structure. To do this, we shall fix the total share of the poverty benefit and child benefit in budget expenditures at the level of 25%. The rest of the experiment conditions are the same as above.

Figure 5 shows the relative level of the FSW depending on the share of child benefit at different values of v ($v = 0$, 2, 10 and 100). The level of 100% was taken as the value of the FSW in a situation where child benefit is not paid and all 25% is accounted for by the poverty benefit.

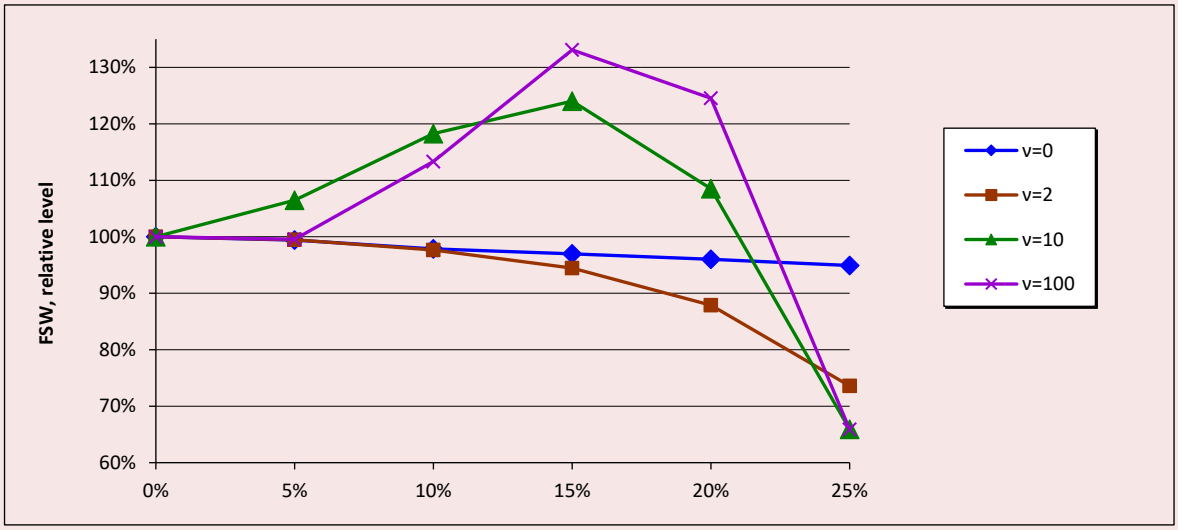
When $v = 0$ and $v = 2$, the child benefit "loses" to the poverty benefit. However, at higher values of v (10 and 100), the choice becomes less unambiguous. At first, as the child benefit's share grows, the FSW increases, but when this share increases to the level of 15% or higher, it begins to fall sharply.

This analysis makes it possible to conclude that the importance of child benefit in terms of ensuring social justice is shown only when there is a sufficiently large rejection of injustice by society. In addition, these experiments show that at high values of v, neither benefit has an unambiguous advantage in itself; the greatest effect is achieved by using two benefits simultaneously.

5. Conclusions

The presented paper reveals the possibilities for using the function of social welfare approach in the analysis of social policy. They form the basis of the theoretical significance of the research. Attention is focused on how changes in various social transfers affect the household agents' well-being. In order to provide the experiment purity a static version of the model was used, where the production capacity of the economy and other key parameters remain at the same level. After a sufficiently large number of periods, the model comes to a state of quasi-equilibrium, for which the values of the

Figure 5. FSW depending on the share of child benefit for a combination of poverty benefit and child benefit at different values of v



Source: authors' calculations.

economic indicators characterizing the results of economic policy are determined. First of all, the dependence of the function of social welfare (FSW) on various variants of the benefit structure was considered.

The study is based on an ABM of a relatively complex structure, including intersectoral, interregional and spatial effects. It turned out that social benefits are quite successfully integrated into this model, and the main effects of the benefits are fully manifested in it.

The transfers distributed among the households in proportion to income do not reduce economic inequality, and they generally have no social component. The transfers that have been widely discussed in recent years, which model universal basic income, are not based on the selectivity requirement that is usually imposed on social support.

If society is sufficiently intolerant of social injustice, then social policy should be comprehensive. This thesis is clearly confirmed by the experiments with a combination of child benefit and poverty allowance. Each of these benefits in itself can lead to a significantly lower level of well-being than their combination, but this effect is manifested only when there is a sufficiently high level of inequality rejection v of the isoelastic function of social well-being.

In the future, using the developed methods for assessing the consequences of changes in the structure of various social transfers, it is proposed to approximate the parameter of inequality rejection in the isoelastic FSW, corresponding to the actual social policy that has developed in the Russian economy. This will show how much social injustice and inequality is actually unacceptable in the society. In addition, the model structure allows to analyze in more detail other important aspects of social policy, such as spatial inequality, the relationship between the federal and regional levels, the relationship between generations, and long-term changes depending on the management of public debt.

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Improving the Tools for Assessing and Managing Export Activities of SMEs in the Region*

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Abstract. Internationalization of small and medium-sized enterprises (SMEs) through the access to foreign markets is one of the key issues in economics. Currently, the urgency of tasks related to the pace of economic growth, the increase in the gross regional product, and the expansion the territories' budget revenues is increasing. Non-resource exports are mentioned as one of the sources of growth of the Russian economy until 2024 in the "May" decrees of the President aimed at increasing its competitiveness. Increasing the share of SMEs up to 10% in the total volume of non-resource exports is one of the key tasks of the national project "SMEs and support for individual entrepreneurial initiative". At the same time, there is a number of problems hindering the effective use of the existing SMEs' export potential as a source of economic growth at the regional level of the Russian Federation. The most acute ones are the following: low competitiveness of the SME manufacturing sector; lack of experience in foreign markets and absence of effective measures to support SME exporters; lack of strategies for using SMEs' export potential, as well as of effective mechanisms and tools for their implementation at the regional level. In this regard, the aim of the research is to develop an approach to managing export activities of SMEs in the region. The article systematizes the research results in various scientific areas and theories related to the management of export activities of SMEs in the region, allowing to identify the main characteristics and features of this process. The author has developed an approach to assessing the specifics and specifications of SMEs in exports and their contribution to the total regional exports, allowing to determine directions

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for further support areas development. The analysis of the existing export promotion system is carried out. The directions, regulations and tools for the Federal and regional levels forming a unified system of SMEs management and support in terms of export activities are proposed.

Key words: management, internationalization, export activities, small and medium-sized businesses, region.

Introduction

One of the most profitable strategies for achieving national development goals in both developing and developed countries is promoting export development of small and medium-sized enterprises (SMEs). The formation of the ability to internationalize firms is possible when the prerequisites for managing export activities of the SME sector (determining their strategy and actions) are created in the dialogue between the regional authorities and business, but do not involve only projects declaration and planned quantitative values of indicators.

In 2018, national projects were approved in Russia. Within the framework of the national project "SMEs and support for individual business initiatives", a goal to achieve a 10% share of small and medium-sized businesses' exports in the total volume of non-resource exports by 2024 has been set[1]. Solving this problem requires a systematic approach and high-quality solutions in the field of export management in the region. However, today there are no comprehensive solutions to this problem.

In this regard, the purpose of the study is to develop an approach to managing the export activities of small and medium-sized businesses in the region. To achieve this goal, the following tasks have been completed:

1. Scientific theories concerning export activities of small and medium-sized businesses in the region have been analyzed, which allowed to identify the main characteristics and features in the management of this process.

2. The specifics of SMEs have been assessed to determine the contribution to the total regional exports.

3. The approach to export activities management in Russia with the allocation of features in terms of small and medium-sized businesses at the regional level has been studied.

4. Developed directions, regulations and tools for the federal and regional levels, forming a unified system of managing and supporting small and medium-sized businesses in terms of conducting export activities.

Theoretical aspects of the research

The issues of SMEs' participation in international trade and assessment of firms' readiness for internationalization are the subjects of research by many economists. As a rule, scientists are based on the theories of international trade (liberalism and protectionism), which can be found in many works on the world economy and international economic relations [1; 2]. Usually, the degree of participation in international trade and the achievements of individual countries and regions in this area are determined by the presence of competitive advantages, the appearance of which is due to the presence of certain factors of production [3; 4; 5].

General approaches in the theory of entrepreneurship that affect export issues, including determining the degree of SMEs' development effectiveness in an international context, were developed in the works of such

[1] National project "Small and medium-sized businesses and support for individual business initiatives". Available at: http://static.government.ru/media/files/ualhTsGOc72APotuEQUjhoENhq1qYz4H.pdf

scientists as T. Singer, S. Lee, M. Kotabe, A. Bernard, S. Gupta, T. Melewar, M. Cinkota, P. Mukerji, A. Panagariya [6–10].

The ability of firms to internationalize has attracted researchers' considerable attention (C.A. Solberg et al., J.W. Lu, P.W. Beamish, J. Child et al., C. Mayer, D.S. Siegel, M. Wright) [11–14]. Alternative approaches to managing SME exports were analyzed, as well as the links between internationalization and resource availability (L. Kubickova et al., N. Dominguez et al., S. Estrin et al., Potter J., F. McLeay, H.C. Andersen) [15–19]. In particular, for small firms, attention is often focused on how resource and information constraints determine the companies' strategy and actions in the foreign market. Most of the literature on the export of small and medium-sized enterprises includes the process (step-by-step) approach to management proposed by J. Johanson and J.E. Vahlne, and the new international concept "born globally" (G. Knight, and S.T. Cavusgil, B.M. Oviatt and P.P. Mc. Dougall) [20; 21; 22]. Despite the criticism, the step-by-step export management model is crucial for the SME sector. It focuses on managing through experience and organizational elements, especially when considering internationalization processes among SMEs with their well-established position in the domestic market.

Some studies (for example, Majocchi et al.) use "company age" as one of the variables that is taken into account in export management and indirectly characterizes the duration of the experience of firms' internationalization [23]. It is assumed that "company age" and internationalization experience will be positively associated with the degree or intensity of firms' international participation in exports.

From K. Helmers' point of view, the choice of generalizing indicators allows to make an in-depth economic analysis and identify negative trends in the management of foreign economic activity [24]. According to the calculations of H. Hoyt (Hoyt model), high values of indicators that characterize exports justify the inclusion of a specific territory into the system of external relations with other countries and regions [25]. In the Heckscher – Ohlin model (specification), the differences in exports were explained by differences in the countries' relative availability with factors of production or other characteristics, such as buyers' preferences in trading partner countries [26; 27; 28].

Therefore, in order to effectively manage the export activities of small and medium-sized businesses that can ensure economic growth, it is necessary to take into account the assessment of SMEs' specifics in exports and the analysis of their specifications in the regions [29].

Research methodology

The study of Russian exports, as well as the definition of its constituent product groups, is carried out taking into account the regions' specialization. For these purposes, a methodological approach is used (Balassa and Lafay) [30; 31; 32]. Export specialization is determined by the ratio of the specific weight of a product (a set of products in the industry) in a country's export to the specific weight of a product (similar products) in world exports. The value of the indicator for a product group greater than one indicates the country's (region's) exports specialization in this production sector [33; 34].

The analysis of the qualitative characteristics of small and medium-sized businesses' exports in the regions suggests determining their contribution to non-resource exports [35]. At the moment, the authorities and management bodies in charge of the foreign economic block use the approach of AO "Russian export center" (REC), which consists in attributing exports to primary materials or non- primary materials, depending on the degree of human participation

in the formation of the product's principal characteristics[2]. However, this approach has the following disadvantages: first, the non-primary category of goods includes both primary crop production (grain) and high-tech products; second, intermediate goods (metals, fertilizers, and others) contribute to the structure of non-primary exports to a greater extent; third, this approach puts quantitative characteristics first (volumes expressed in monetary units and the number of export contracts concluded), and the quality ones are relegated to the background.

These disadvantages are overcome in the approach of the Vologda Research Center of the Russian Academy of Sciences [36; 37]. It is based on the allocation of primary (including semi-finished products) and non-primary product groups in accordance with the unified commodity nomenclature of foreign economic activity. Besides, the advantages of this approach include taking into account the priority areas of Russian exports approved in the state program of the Russian Federation "Development of Foreign Economic Activity": improving export specialization of the Russian Federation, export diversification through a consistent increase in exports of non-primary goods.

The methodological approach we use differs from the existing ones by defining the specifics (1) and specification (2) of SMEs' exports, both for the country as a whole and for each individual entity.

1. Specificity reflects the quality characteristics in exports and allows performing sectoral analysis up to a specific product portfolio. It is determined by the ratio of the volume of exports of a specific group of goods (by type or sector) to the total supply of the entire country (region) to foreign markets.

2. Specification allows to identify (evaluate and detail) SMEs' place in exports, as well as its territorial orientation through the specified analytical parameters. The specification refers to a set of indicators, the main of which is calculated as the share of SMEs' export supplies in the total volume of exports of a country (region). Supporting indicators are the share of SMEs' exports in the country's non-primary exports; the share of machine-building products in the country's non-primary exports in relation to the share of SMEs' exports in non-primary exports; the share of SMEs' exports in the volume of exports of competitive industrial products (non- primary materials). As a result, the profile of the country's (region's) specification in the export is formed.

In the framework of this paper, the specifics and specifications of Russia and its regions are based on the product groups specified in the classifications of the REC and the Vologda Research Center of the Russian Academy of Sciences (primary materials, non- primary materials, semi-finished products).

The developed approach to assessing the specifics and specifications of SMEs in export provides a comprehensive and complete description of trends in international trade for making specific management decisions in the field of export activities of small and medium-sized businesses.

Main research results

To understand the situation with SME exports, it is necessary to take into account their characteristics, as well as the main trends. The specialization of Russian exports in the years of 2007–2017 remained unchanged. The main commodity groups include mineral products, products of the fuel and energy complex, which for the entire period (from 2007 to 2017) account for the largest share in the total volume of export of goods abroad (*Table 1*).

The performed assessment shows that with all the favorable conditions created and the support measures applied for the development of non-primary exports, high-value-added

[2] Export classification. Available at: https://www.exportcenter. ru/international_markets/classification/

goods and machine-building products are not a specialization for Russia in deliveries to foreign markets. This means that Russia is in the "zero zone" in these product groups (the share of the product group is less than one in the total volume, according to Balassa and Lafay) by export specialization, although it has potential (including mechanical engineering; SME sector).

Analysis of the specifics of Russian exports in dynamics (*Table 2*) showed that low-tech goods and raw materials accounted for the largest share in 2013–2017. At the same time, highly processed products (engineering products, pharmaceuticals and hygiene products, construction tools, plastic products in combination with other materials, ready-made food products, various industrial goods and textiles), which are the engines of regional economic growth, accounted for the smallest part in 2017 compared to raw material exports.

Thus, the main problem of Russia's export activity remains a high degree of export orientation to the sale of products with low added value, semi-finished products and energy resources, which results in a large dependence on prices for fuel and raw materials, which, in turn, leads to instability of the economy [38; 39]. In view of this, it is crucial to identify priority areas for the export activities development. Supporting the non-resource sector of small and medium-sized businesses at the regional level should be one of them.

Table 1. Components of the Russian export specialization group (for the period of 2007–2017)*

Product / goods	2007	2010	2017
Mineral products, fuel and energy complex products	4.3	3.9	5.1
Metallurgical industry products	1.8	1.3	1.4
Forest and logging industry products	1.1	0.9	1.2
Other categories of finished products and goods	1.3	1.3	0.7
Food industry products and agricultural raw materials	0.2	0.3	0.6
Chemical industry products, plastics, caoutchouc, rubber and products made of them	0.4	0.4	0.5
Production of other non-metallic products	0.2	0.2	0.3
Engineering products	0.1	0.1	0.1
Goods, materials and finished products of light industry	0.1	0	0

* Export specialization is determined by the ratio of the product's specific weight (a set of products in the industry) in the country's export to the specific weight of the product (similar products) in world exports. The ranking of products is based on data for the year of 2017.
Compiled by: UN COMTRADE statistics. Available at: https://www.trademap.org

Table 2. Dynamics of export specifics* in Russia in 2013–2017

Export type	2013	2014	2015	2016	2017	2017 to 2013, %
Commodity exports, billion US dollars	270.1	239.1	155.3	127.3	161.1	59.6
Share in the country's total exports, %	51.4	48.1	45.2	44.6	45.0	-6.4
Energy exports, billion US dollars	113.7	119.9	70.6	49.3	62.9	55.3
Share in the country's total exports, %	21.6	24.2	20.5	17.3	17.6	-4
Export of products and semi-finished products, billion US dollars	89.9	85.5	73.1	66.4	84.7	94.2
Share in the country's total exports, %	17.1	17.8	21.3	23.3	23.7	6.6
Non-primary exports, billion US dollars	55.2	49.8	44.5	42.6	49	88.8
Share in the country's total exports, %	9.9	10	12.9	14.9	13.7	3.8

* The author's technique calculation results were used when evaluating the specifics of Russian export (method of the Vologda Research Center of the Russian Academy of Sciences described in the section "Research methodology").
Calculated by: Customs statistics of foreign trade of the Federal Customs Service of the Russian Federation. Available at: http://stat.customs.ru/apex/f?p=201:2:1163249375198765::NO

In this regard, the main task in the foreign economic sphere for Russia is the development of a unified methodological approach to assessing the current situation, including the creation of a system of indicators for a comprehensive assessment of Russian non-commodity exports at the national level (taking into account the SME sector's contribution), based on the definition of the specifics and specification of the country (region).

This necessitates improving the quality of assessment of small and medium-sized businesses in the Russian export of non-primary goods, since its results will become the basis for the development and adoption of management decisions at the federal level. As already noted, one of the key objectives of the national project "Small and medium-sized businesses and support for individual business initiatives" is to increase the small and medium-sized businesses' share by at least 10% in the total volume of non-resource exports by the end of 2024. This is a daunting challenge posed to the regional authorities and management by the Russian Government. It is possible to solve it only if there is an objective (without concepts substitution) approach to the assessment of quality characteristics and specific features in the export activities of small and medium-sized businesses.

When evaluating the SMEs' export specification, the authors also used data obtained from the calculations of export status in Russia and the regions by means of the two methods, one of the REC's and another of the Vologda Research Center of the Russian Academy of Sciences (*Table 3*).

Table 3. Indicators of SMEs' export specification taking into account the approaches in the non-resource exports

Indicator	Block 1* "Normal (basic) action – net export" (cf. 2015-2017 value)		Block 2* "Strategic action – export growth" (value by 2024)	
	REC's approach	VoIRC RAS's approach	REC's approach	VoIRC RAS's approach
1. SMEs' export volumes in Russia, billion USD	no data	7.3	10.1	8.5
2. Share of SMEs' export in the country's total exports, %	no data	2.2	2.2	1.8
3. Share of SMEs' exports in the country's non-resource exports, %	7.2	21.3	5.1	24.7
4. Volumes of transaction load in non-resource exports per SME engaged in export activities, million USD	0.4	0.3	0.3	0.2
5. The growth of SMEs' exports in relation to the growth of non- resource exports, %	150.5/113.7	107.7/110.1	138.4/156.3	116.4/115.7
6. The share of engineering products in the country's non-resource exports in relation to the share of SMEs' export in non-resource exports, %	25/7.2	58.2/21.3	24/5.1	57.3/24.7
7. Share of SMEs' export in the volume of competitive industrial products (non-resource) export, %	6.5	28.9	4.9	18.8

* Block 1 takes into account the current state of SMEs' export (cf. the value of 2015-2017) with an assessment by indicators; block 2 takes into account the value of the national project "Small and medium-sized businesses and support for individual business initiatives" in terms of increasing exports.
REC - AO "Russian Export Center"
VoIRC RAS - Vologda Research Center of the Russian Academy of Sciences
Compiled by: Customs Statistics of Foreign Trade of the Federal Customs Service of the Russian Federation. Available at: http://stat.customs.ru/apex/f?p=201:2:1163249375198765::NO

Based on the data in the table, the following conclusions can be drawn:

1. There is no statistical accounting of SMEs' export volumes in Russia in value terms after 2015. At the same time, analytical documents by relevant ministries and departments, as well as chief economists, address the issues of SMEs' export development. However, the problem is that concrete specifics and data on the size of SMEs' exports are not reflected in the official documents and analytical reports. This makes it difficult to understand the current situation regarding the specifics of export of small and medium-sized businesses in Russia and in the regions since 2015.

2. The share of SMEs' exports in the country's total exports, according to our estimates, averaged 2.2% in 2015–2017, while the number of participants in small and medium-sized enterprises engaged in export activities more than doubled (by 224%).

3. According to our calculations, the share of SMEs' non-primary net exports in the volume of Russian non-primary exports by the classification of the AO "Russian Export Center" is 7.2%. This approach takes into account the specifics of lower-value goods groups (55.4%), indicating a "soft" export structure, formed mainly by a portfolio of products with low added value, focused on declining and stagnating markets. When using the second approach (VolRC RAS), the value of this indicator reaches 21.3%. This means that the approaches record almost a two-fold difference in the values of the indicator. When using the second approach, the contribution of SMEs' exports to non-primary exports is 14.1% higher than when using the first approach. This is due to the specifics of the goods structure in the non-resource exports used in the assessment.

4. In non-resource exports, the volume of transaction load per a SME engaged in export activities is estimated to be lower when using the second approach than when using the first one. We should add that with a lower transaction load, the probability of fulfilling export contracts for SMEs increases, which means that they will get a positive experience when working in the foreign market. This improves the prospects for interaction with foreign trade partners, which, in turn, will contribute to the development of foreign economic relations and increase the competitiveness of the economy in a particular region.

Along with the analysis of specifics and specifications carried out at the country level, the research includes a similar assessment in the regional context, and then identifies the types of regions by the designated features. The practical significance of this analysis is due to the need to understand the current situation in the export of SMEs in a specific territory, which is important when developing effective management decisions in the SMEs' export activities.

When analyzing exports structure in the regions of Russia by product type and calculating the indicator associated with the assessment of the level of SMEs' export specificity, the groups of "international component" were identified in the industry and a typology was built (by the specific weight of goods in the regional export structure, *Table 4*). The value of the export specificity indicator allows to identify a range of goods and industries that are internationally typical for the territory. An industry in a region is considered export-specific if the indicator is greater than one.

Sector 1 includes 4 regions, their share in Russian exports is 10.5%. Most of the exports' commodity structure at the regional level is made up of agri-food products, food products and agricultural products of primary processing.

Sector 2 is represented by 19 entities (35% of the total Russian export volumes). The

Table 4. The types of Russian regions by SMEs' export specifics

Name*	Regions
Sector 1	Kamchatka Krai, Rostov Oblast, Magadan Oblast, Kabardino-Balkar Republic
Sector 2	Moscow, Saint Petersburg, Sakhalin Oblast, Primorye Krai, Republic of Sakha (Yakutia), Amur Oblast, Kemerovo Oblast, Republic of Buryatia, Tomsk Oblast, Tyumen Oblast, Republic of Tatarstan, Republic of Bashkortostan, Udmurt Republic, Leningrad Oblast, Arkhangelsk Oblast, Republic of Komi, Republic of Mari El, Krasnodar Oblast, Volgograd Oblast
Sector 3	Stavropol Krai, Karachay-Cherkess Republic, Republic of Adygea, Tula Oblast, Voronezh Oblast, Smolensk Oblast
Sector 4	Khabarovsk Krai, Irkutsk Oblast, Perm Krai, Kirov Oblast, Saratov Oblast, Republic of Karelia
Sector 5	Krasnoyarsk Krai, Sverdlovsk Oblast, Chelyabinsk Oblast, Republic of Khakassia, Novgorod Oblast, Vologda Oblast, Pskov Oblast, Belgorod Oblast, Lipetsk Oblast
Sector 6	Novosibirsk Oblast, Kurgan Oblast, Ulyanovsk Oblast, Republic of Mordovia, Republic of Dagestan, Astrakhan Oblast, Kaliningrad Oblast, Moscow Oblast, Yaroslavl Oblast, Tver Oblast, Kaluga Oblast, Vladimir Oblast, Bryansk Oblast, Ivanovo Oblast
* Sector 1 – agri-food sector; Sector 2 – consumer goods; Sector 3 – chemical industry products and related products; Sector 4 – wood and wood products, eco-products; Sector 5 – construction materials, metal products; Sector 6 – machinery, equipment, spare parts and accessories. Calculated by: author's approach using data from the Customs Statistics on Russian Foreign Trade.	

Table 5. Russian regions' grouping by the territorial specification of SMEs' export

Name*	Regions
Group 1 (< 50%**)	Moscow, Saint Petersburg, Belgorod Oblast, Voronezh Oblast, Kostroma Oblast, Kursk Oblast, Lipetsk Oblast, Ryazan Oblast, Tver Oblast, Tula Oblast, Yaroslavl Oblast, Republic of Karelia, Komi Republic, Arkhangelsk Oblast, Vologda Oblast, Kaliningrad Oblast, Leningrad Oblast, Murmansk Oblast, Novgorod Oblast, Republic of Kalmykia, Krasnodar Krai, Astrakhan Oblast, Volgograd Oblast, Rostov Oblast, Republic of North Ossetia – Alania, Stavropol Krai, Republic of Mari El, Republic of Bashkortostan, Perm Krai, Kirov Oblast, Nizhny Novgorod Oblast, Samara Oblast, Saratov Oblast, Ulyanovsk Oblast, Sverdlovsk Oblast, Tyumen Oblast, Chelyabinsk Oblast, Republic of Altai, Republic of Buryatia, Republic of Tyva, Republic of Khakassia, Zabaykalsky Krai, Krasnoyarsk Krai, Irkutsk Oblast, Kemerovo Oblast, Tomsk Oblast, Republic of Sakha (Yakutia), Kamchatka Krai, Primorsky Krai, Khabarovsk Krai, Amur Oblast, Magadan Oblast, Sakhalin Oblast, Jewish Autonomous Region, Chukotka Autonomous Okrug
Group 2 (< 50%**)	Vladimir Oblast, Ivanovo Oblast, Kaluga Oblast, Moscow Oblast, Oryol Oblast, Smolensk Oblast, Tambov Oblast, Pskov Oblast, Republic of Adygea, Republic of Dagestan, Kabardino-Balkarian Republic, Karachay-Cherkess Republic, Republic of Mordovia, Chuvash Republic, Orenburg Oblast, Penza Oblast, Kurgan Oblast, Altai Krai, Novosibirsk Oblast, Omsk Oblast
* Group 1: territorial focus – EU, APEC, BRICS, and ECOWAS countries; Group 2: territorial focus – EEU and CIS member states. ** The volume of exports to this group of states. Calculated by: author's approach based on data from the Customs Statistics of Russian Foreign Trade.	

largest share in deliveries to foreign markets of the regions' exports structure is made up of goods from the economy of "simple things".

Sector 3 includes 6 regions, their share in the total volume of Russian exports is 5.2%. The specifics of these regions' export structure are related to chemical products, consumer goods and goods that are used in the manufacturing sector.

Sector 4 is represented by 6 regions, the share of which in the volume of the all-Russian export group is 17.5%. The main commodity group in the export structure is wood and products made from it (with a predominance of medium-processed goods and eco-friendly products).

Sector 5 includes 9 subjects (12% of the total Russian export volumes). Their export structure is represented by the commodity group "metals and products from them", where the main segment is simple products.

Sector 6 contains 14 regions (19.8% of all-Russian export volumes), the basis of the exports commodity structure here is made up of machine-building products (goods with high added value).

During the study the author also calculated the regions' specification (the ratio of the subject's supplies to the international region to the total volume of regional exports), which resulted in the identification of two typological groups with characteristic export directions (*Table 5*).

The first group includes 61 entities (47.2% of all-Russian export volumes), the key export destinations of which are European, Asian, and West African States (the European Union, BRICS, the Asia-Pacific Union, and the United States). The structure of exports is made up of technical and food products of various industries, including eco-products.

Export of the second group, represented by 19 regions (52.8% of all-Russian export volumes), is focused at the member states of the EEU and the CIS. The export commodity structure includes mixed groups of non-primary products and simple products. In general, the territories' specifics allow us to speak about the balance of SMEs' exports in the regions. In this case, the SMEs' export is considered as one of the tasks of the region's economic development.

Effective economic cooperation with other countries can become the "engine" of economic growth in the region, and then in the country as a whole. The regions with a high level of non-resource exports are characterized by higher risks, but they are more resistant to crisis events [40]. As a result of the analysis of spatial specifications of the SMEs' export, a group of regions (external relations are crucial for territorial space) has been formed, in which the relationship between the studied factor and the occupied group of exports can be discerned.

Thus, in order to prioritize the SMEs' export development in the region, it is necessary to use the tools for assessing the territorial specification and the specific foreign market (the impact of foreign competition). These include an assessment of foreign market conditions, analysis of compensatory measures, and assistance mechanisms used in international export practices for effective SME sector diversification in the region.

In world practice, the formation of a whole package of measures to support foreign economic activity of small and medium-sized businesses can be noted. Russia is no exception, where a state system of support for foreign economic activity has been established at the federal level, including the following types of measures and institutions (*Figure*).

In addition to the mentioned measures and institutions supporting SMEs' export, special business regimes for enterprises engaged in foreign economic activity are applied within special economic zones operating on the territory of the Russian Federation[3]:

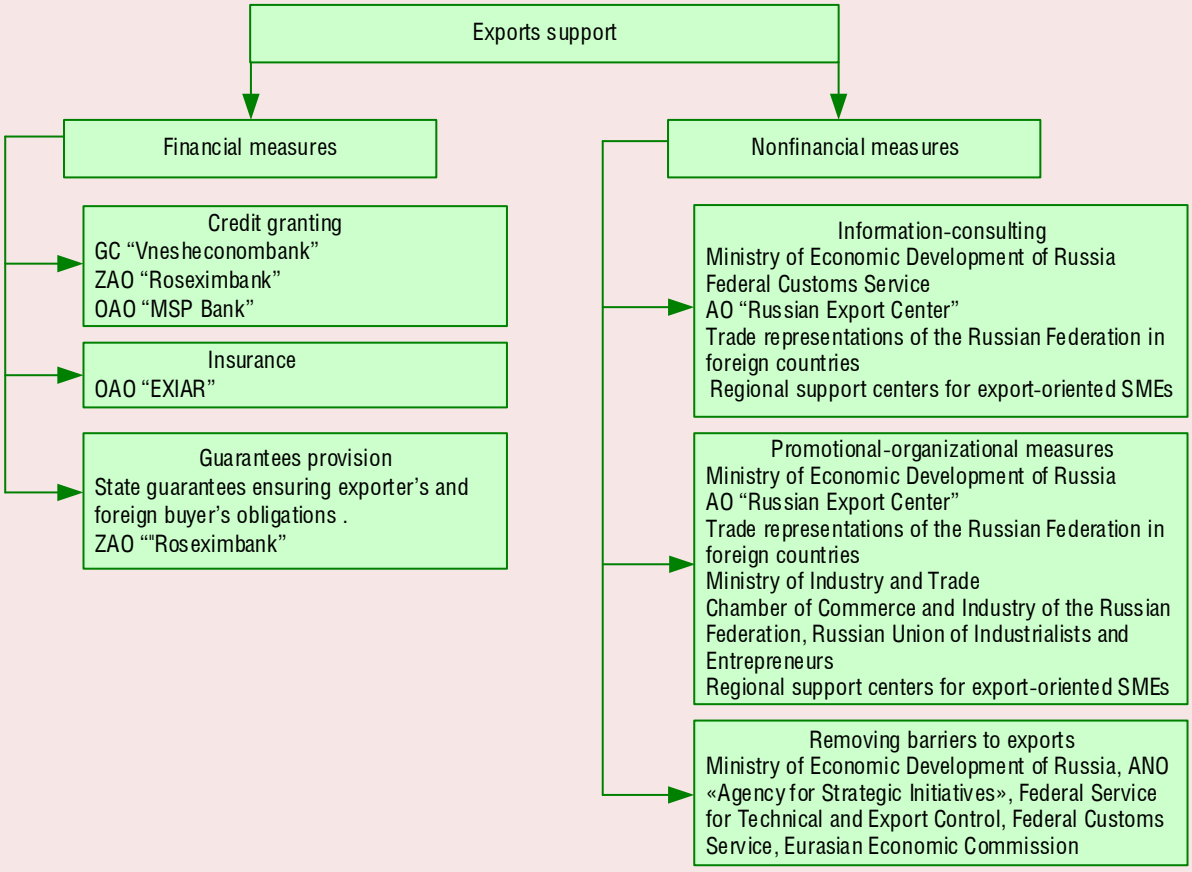
– the possibility for an investor to get the infrastructure for business development created at the expense of the state budget;
– provision of tax preferences;
– receiving customs benefits;
– interaction with state regulatory authorities through the "Single-window" administration system.

Having analyzed the structure of foreign trade support in Russia, we can conclude that a system of institutions and tools for export development has been created at the federal level, and their analogues operate abroad [41; 42].

At the regional level, SMEs' export support is currently being implemented in 40 regions in 8 federal districts of the Russian Federation (5 units in the Central, 6 in the North–West, 5 in the South, 1 in the North Caucasus, 3 in the Far East, 5 in the Ural, 6 in the Siberian, 9 in the Volga). It is represented by export support centers (or special divisions in business

[3] Foreign economic information of the Ministry of Economic Development of the Russian Federation. Available at: http://www.ved.gov.ru/rus_export/svodniy_reestr_institutov_i_instrumentov_podderzhk/

Measures and institutions for export support and development in Russia



Source: Foreign economic information of the Ministry of Economic Development of the Russian Federation. Available at: http://www.ved.gov.ru/rus_export/svodniy_reestr_institutov_i_instrumentov_podderzhk/

support infrastructure organizations, such as ANO "My business"), created for the purpose of information and analytical, consulting and organizational support of foreign economic activities of SMEs in Russia. As of 2017, according to the Ministry of Economic Development of the Russian Federation, 350 million rubles were allocated for the activities of export support centers, and another 170 million rubles were co-financed from regional budgets[4]. The main tools of export support centers are [43]:

– encouraging small business in the regions to conduct export activities;

– assisting commodity producers in entering the interregional and international market;

– organizing and holding enterprises' business missions to any country in the world, depending on the needs of the export activities participant.

A study of the Russian regions' experience in supporting non-primary exports has shown that the examples of notable exporters' support include Moscow, Saint Petersburg, the oblasts of Moscow, Kaluga, Novosibirsk, Tomsk, Omsk, Oryol, Vladimir, Nizhny Novgorod, Sverdlovsk, Yaroslavl, and the Republic of Tatarstan. According to publicly available analytical data for 2017 (no information is available for 2018–

[4] Economy: the government will help to enter foreign markets. Available at: https://wtcmoscow.ru/services/international-partnership/actual/ekonomika-vyyti-na-zarubezhnye-rynki-pomozhet-pravitelstvo/

2020), the following indicators were achieved in these 13 regions of the Russian Federation:

– the number of small and medium-sized enterprises that received services in the centers increased by 10–20%;

– the number of small and medium-sized enterprises that started exporting their products to the non-primary export segment increased by 49%.

Despite the organization of a single window support system for the exporters, only a few representatives of the SME sector, including innovative companies, manage to create a successful business at the international level [44]. The reason for this is not only the regions' geographical location, but also the lack of sufficient financial, information and human resources required to enter the foreign market. To address these problems, it is necessary to continue to develop the infrastructure for the small and medium-sized businesses' support, provide specialized high-quality services for export-oriented SMEs, and create conditions to ensure their access to the interregional and international markets. In addition, the centers should implement measures aimed at improving the professional level of employees and top managers of such export-oriented small and medium-sized businesses, as well as attract professional consultants to solve certain local problems.

At the same time, a significant coordinating role in the field of export promotion should belong to the territorial authorities. The Federal Centre indisputably remains to be in charge for the strategic study of the issue, whereas the stimulation of foreign economic relations should gradually move from the federal level to the regional one, since maintaining jobs, providing tax base and other comparable issues largely fall on the regional governments at the present stage of the regional economic complex's development.

Recommendations for managing SMEs' export activities in the region

At present, the system for managing, primarily for promoting SMEs' exports, is not aimed at long-term development and expansion of non-primary and high-tech products exports. This is due to a number of key problems in managing the SMEs' export activities in the region. First, financial support measures are mainly concentrated at the federal level, they are distributed among all participants in export activities (including large businesses), which does not allow to fully stimulate the development of SMEs' exports in the regions. Second, export support centers in the regions pay more attention to the organization and holding business missions, rather than complex work aimed at developing the SMEs' export potential. Third, and most important, the specifics and specification of SMEs' exports are not taken into account. The focus is just on increasing the number of exporters including any company that has made at least one delivery abroad.

To activate export-oriented SMEs in the regions, it is necessary to identify priority measures of state support. To do this, it is important for the authorities and management to take into account the priorities of public policy and provisions for improving management processes in the field of export activities (including SMEs) at different levels.

1. It is required to meet the following objectives in the sphere of public policy at the federal level:

– updating the methodological approaches currently used for evaluating exports (including SMEs) in order to determine the specifics and specifications;

– ensuring access of the region's industrial enterprises to foreign technologies;

– developing high-tech production in the regions in order to develop export potential;

– supporting collaboration with foreign partners in science and industry in order to facilitate the transfer of technologies to the territories' economy;

– promoting domestic high-tech products to foreign markets.

2. In the sphere of state policy at the regional level, the following tasks should be provided for:

– building an effective program to support full-cycle export activities of the "region – federal center – region" type, where the beneficiary is the exporter, and the prerogative in obtaining financial support and non-financial measures is at the regional level in cooperation with national specialized organizations and supervising ministries;

– developing segmental support forms with the construction of an integrated system aimed at the development of export-oriented non-resource industries, taking into account the best practices of foreign countries;

– identifying the promising territorial workshop groups (sectors) for the formation of financial forms of support at the regional level, aimed at specific beneficiaries, taking into account the analysis of specifics and specifications.

In terms of improving the processes of managing the development of SMEs' export activities, it is advisable to take into account the need to implement the following tools and measures by the authorities and management responsible for the foreign economic block.

Block 1 "Integrated assessment"

First, it is necessary to have a methodology (developed in the software environment, taking into account the existing Russian and foreign experience) allowing to evaluate the export activities of small and medium-sized businesses.

Second, it is worth considering the SMEs' export not only in value terms, but also with the allocation of concrete specialization and specification in the region based on the customs nomenclature of foreign economic activity.

Third, it is advisable to assess the SMEs exporters' contribution to the economy of the country and regions. Also, when conducting an assessment at the regional level, it is necessary to take into account the territory's export specifics.

Fourth, to assess SMEs' exports, it is necessary to use the results of domestic research carried out by scientific institutions and universities.

Fifth, it is necessary to organize networking between all participants involved in export issues, entrepreneurship and regional management to assess the SMEs' export, in order to develop export activities of small and medium-sized businesses in the region that contribute to economic growth.

Unit 2 "Development priorities":

1) development and expansion of SMEs' high-tech and innovative products exports for the formation of new products and market segments, improving the quality of products produced from local raw materials, with the possibility of participating in major integration projects;

2) creation and development of regional infrastructure to support export-oriented SMEs with an emphasis on the technology companies' development (ensuring the construction of strategic priorities and effective alignment of the state's export policy);

3) increasing export activity and a culture of behavior in the foreign market among the business sector (to stimulate entrepreneurial ability in international expansion);

4) financial support and assistance in attracting investment in export projects implemented by SMEs (to promote regional exporters in the national interest in the global economy);

5) increasing the availability of quasi-credit resources for exporters (to reduce risks with foreign partners (non-fulfillment of contractual obligations, securing property rights, insufficient patent protection, etc.));

6) implementation of effective information systems for export project management in the SME sector (regulation and standardization of business processes, which allow to quickly adapt the system to the requirements of the range of stakeholders);

7) introduction of modern digital management systems for the SME exporter with the construction of business networks abroad (to improve the company's image in the eyes of foreign and Russian partners, as well as to increase the enterprise's investment attractiveness).

Conclusion

The result of the conducted research consists in developing an approach to the classification of SMEs' exports in the region, which allows to assess its structural specificity and specification. The essence of the developed approach, in contrast to the existing ones, is to form the indicators (the volume of SMEs' exports; the share of SME's exports in the volume of all country's deliveries to foreign markets, as well as non-primary goods) that reflect the sectoral characteristics of SMEs' export activities. Using the approach makes it possible to present the SMEs' contribution and its specifics in regional exports for each industry sector, which allows determining the prospects for further development of the region's economy and scientific and production cooperation.

Due to the lack of organized comprehensive (systematic) work to manage the export activities of small and medium-sized businesses aimed at the territory's development in the regions, the conceptual provisions and directions for improving these processes at the federal and regional levels have been developed and scientifically justified, allowing to activate the SMEs' export potential.

The proposed method, which consists in using a systematic approach (from assessing the specifics and specification of SMEs' exports to developing specific priorities, tools and measures) in managing the export activities of small and medium-sized businesses in the region, allows to fill in the gaps in solving this issue.

The research contributes to the theory of entrepreneurship development in terms of the internationalization of the SME sector at the regional level. Its results can be used to analyze the regional SMEs' export, as well as to develop program and target documents in the field of foreign economic sector management aimed at the territory's development.

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Population of the World Arctic: Russian and Foreign Approaches to Studying Demographic Problems and Settlement of Territories*

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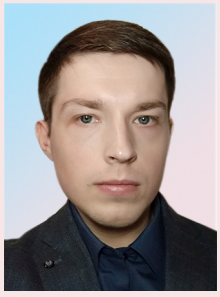

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Abstract. The researchers are considering the population, demographic processes and settlement of the World Arctic. It is noted that many issues have accumulated in the Arctic: from socio-demographic problems to resettlement ones. Each country solves these problems in its own way, using both universal and private approaches. The article is aimed at considering approaches used in the Russian and foreign practice to studying demographic processes and settlement of the World Arctic. Among the Russian and foreign approaches, it is necessary to mention the following ones: demographic zoning, gender, geopolitical, qualitative, combined, intersectoral, descriptive and historical, statistical, network, systemic, socio-psychological, sociological, technical and economic, ecological and biological approaches, and others. Using these approaches the process of settlement/colonization, the system of the population's resettlement, and demographic trends in the World Arctic have been considered. It is noted that the colonization of the European North of Russia was taking place from the 10th till the 17th century, Siberia and the Far East – from the end of the 16th till the middle of the 19th century. Settlement has been carried out by its own people; Russia had no need in attracting settlers from other countries. Based on the demographic approach it has been concluded that by the beginning of the 20th century the process of colonization had been completed, and the natural demographic development and further development of the marginal territories had begun. In the foreign Arctic early colonization was of a trade and field nature, then the extraction of raw material resources had started. From the first half of the 20th century the military interest started to dominate; today the economic interest in the development of the Arctic is prevalent. Two opposite trends have been noted in the demographic development: the recessive population dynamics in the Russian Arctic and its constant growth in the foreign one. The settlement network of the Russian Arctic was forming by the network of cities of different sizes, in the foreign one small settlements were created in the initial period; now the network of medium and large cities is expanding. In the recent years the work on a rotational basis has been widely used in the World Arctic.

Key words: the World Arctic, population, demographic processes, settlement of territories, approaches.

Introduction

The scientific interest in the World Arctic (the circumpolar North) is justified by the fact that in the 21st century this megaregion is turning from the northern periphery into the area of economic interests for all major states. Taking into account the strategic interests of the largest states, it can be assumed that the field of "economic and political standoffs" will be the struggle for energy resources. "There will be a dialectical coexistence of cooperation and competition forces – a scenario that can be called "a friendly race" [1, p. 361]. Within the next decades the Arctic can become "the main storage of energy and mineral resources, and, therefore, the attention to it from the world community will be special" [2, p. 16, 19; 3, p. 58–59]. Thus, according to the journal "Science", 83 billion barrels of oil are located in the Arctic, which comprises 13% of the world's unexplored reserves. Natural gas resources compose 1550 trillion cubic meters [4], almost two thirds of them are located at the coast of Russia [5, p. 6]. According to the estimates of the US Geological Survey up to a quarter of the world's undetected hydrocarbon reserves can be situated in the Arctic[1].

The World Arctic includes eight states: Russia, Canada, the USA, Norway, Denmark, Finland, Sweden and Iceland. This list of arctic countries is provided in "The report on human

[1] *Data from the US Geological Survey.* Available at: http://www.usgs.gov (accessed: March 01, 2020).

development in the Arctic" [6, p. 18; 7] and in the materials of the Arctic Council[2]. The composition of arctic territories of the named states, their population and natural and economic potential, and the state strategy have been considered in details [8].

At present, non-arctic states have great interest in the Arctic, such as: China, Japan, South Korea, Singapore, India, Great Britain, Germany, France, Italy, Spain, Switzerland and Poland. They have been granted the status of "observers" in the Arctic Council and take part in economic, social and cultural projects in the Arctic[3].

The Arctic is the inhabitation area of indigenous people, who are represented as the *"fourth world"* in the international political discourse. In Russia they are called a special community of "the fourth dimension", forming the ecological system of values, as well as "saviors of civilization" [9, c. 16–17].

The Arctic's development has led to the appearance of many problems in various areas: demographic, ecological, social and resettlement ones [10, c. 18–25]. All arctic countries are trying to solve them, using different approaches. The focus of our attention will be concentrated on considering demographic processes and settlement of the Arctic. On this basis, the article is aimed at revealing the approaches to studying demographic processes and settlement of the territory of the World Arctic (the WA). The following tasks have been set by the authors: to carry out a comparative analysis of existing approaches to studying demographic problems and settlement of arctic territories; to identify the main characteristics of population and demographic processes in the World Arctic; to define the features and trends in the processes of settlement and the system's evolution in resettlement of arctic territories.

The object of the study is the World Arctic including the territories of eight states. The subject of the study is the country peculiarities of approaches to studying demographic problems and settlement of arctic territories. The scientific novelty of the article is justified by the integrated retrospective and comparative analysis of approaches to studying demographic problems and settlement of arctic territories. The practical significance of the study lies in the fact that the obtained results can be used by the executive authorities in elaborating the programs and strategies for the development of the northern and arctic territories.

Approaches to studying demographic problems of arctic territories

Various approaches are used to study demographic problems in domestic and foreign practice. Let us consider the main ones.

The *statistical approach* is the most prevalent one in demographic studies. It includes obtaining statistical information regarding the population, processing of the received data, building the time series and distributions, analysis of regularities, as well as calculation of reproduction indicators. Statistical methods allow modeling the population's reproduction as a whole, and the certain demographic phenomena.

The *descriptive and historical approach* used for determining the total population and its structure in certain historical periods in relation to the world population, the population of particular countries or parts of the world relies on the same information base and methods of processing.

The *sociological approach* is widely used in demographic studies for fundumental understanding of the factors underlying in the processes of natural reproduction of the

[2] *Arctic Administrative Areas*. Available at: https://arctic-council.org/images/PDF_attachments/Maps/admin_areas.pdf (accessed: March 01, 2020).

[3] *Observers*. Available at: https://arctic-council.org/ru/about/observers (accessed: March 01, 2020).

population, marriage and family relations and migration mobility. The approach allows analyzing not only the factors themselves, but also their reflection in the human consciousness.

The *geopolitical approach* allows evaluating the impact of migration outflow and natural population decline on the national security. Decrease in population up to the critical level, leading to the depopulation of arctic territories, their low settlement against the background of neighboring countries with upward demographic dynamics in the absence of free land for the growing population, can result in a number of serious disagreements regarding geopolitics.

The *socio-psychological approach* is aimed at finding the causes regarding the certain intensity of processes, in the context of socio-psychological characteristics of individuals or social groups. A relatively new point here is the shift from identifying the subjective interests of the individual, family and society as a whole, characteristic of early research, to studying the socio-psychological aspects in demographic behavior of the certain groups of the population.

The *gender approach* takes into account the diversity of factors affecting demographic processes and the crisis of the current demographic situation, especially in marriage and family relations, through "the phenomenon of social self-organization in the relations between the largest and primary social groups – men and women" [11, p. 66]. The importance of using the gender approach is mentioned in the report of the United Nations Economic and Social Council[4].

Demographic zoning is the *approach* that allows determining the population structure of arctic territories. Three types of territories are identified. Firstly, they are the territories with relatively favorable natural and climatic conditions, where medical and geographical indicators allow forming the permanent population. Secondly, they are the territories that are uncomfortable for living for the permanent population, in which the priority should be given to the rotational method of the territory development. Thirdly, they are the territories, where, despite the need in resettlement of the surplus population, it is necessary to preserve at least the part of the permanent population[5] [12, p. 22–23, 128].

The *intersectoral approach* is effective in analyzing demographic processes. For example, in order to reduce mortality, "the opportunities should be used not only from health service, but also from all sectors affecting health, providing the improvement of the environment, working conditions, increase in revenues, lifestyle recovery, etc., so that funds for these purposes are considered as investment in human capital" [13, p. 288–290, 292].

The *technical and economic approach* treats the demographic behavior and differences in population growth rates from the standpoint of "rationality in economic interests of the society, family and individual" [14].

The *ecological and biological approach* considers demographic development in terms of its impact on the natural environment and the ecological situation.

The *combined approach* includes analyzing the combination of socio-economic and biological relations between the human and nature, in which the substantive work is crucial for demographic processes and behavior. This method represents multiplicity or pluralism in evaluating all manifestations of demographic development of the world population, and allows identifying negative consequences of the population's growth/decline [15, p. 27–30, 48, 56, 57].

[4] *The Report of the Economic and Social Council over 1997.* The UN, 1997. 156 p.

[5] In the early 1990s, according to various estimates, the surplus population of the Russian North composed from 20 up to 40%.

The *economic-socio-material approach* is applied at the national level in almost all arctic states in order to offset the severe natural and climatic conditions of the Arctic, isolation from "the mainland" and difficult manufacturing conditions. Application of this approach allows to attract human resources to arctic territories, and to form stable manufacturing collectives there.

The *qualitative approach* goes away from evaluating the role of material factors and focuses on the impact of historical, spiritual and moral, ideological, psychological and other factors on demographic processes.

V.N. Barsukov and O.N. Kalachikova define economic, socio-economic, socio-psychological, institutional, population (biosocial, biogenetic), civilizational (historical and cultural) and phenomenological approaches according to the priority factor of demographic development. The work describes in detail on which theory or concept each approach is based, the personalias are given [16, p. 23–32].

There are a number of private approaches to researching the fertility, mortality, migration and family. They propose the measures to overcome the crisis of marriage and family relations, the degree of possible interference in the regulation of fertility, what measures of public policy can change the reproductive attitudes of the family to have few or no children, how to make Russia attractive for migration, and justify depopulation with spiritual ill-being of the family and society [11, p. 63]. "The whole variety of viewpoints can be reduced to two paradigms – the modernization paradigm and the family crisis paradigm" [17, p. 239].

Within the development of the Arctic, foreign approaches differ from the Russian ones in many directions: in demographic context, in constructing inter-budget relations, and in infrastructure development [18, p. 30]. So, our northern neighbors are betting on solid development and settlement of the territory. We almost forcibly settle out northerners to the "mainland", but the authorities of Alaska subsidize (200–250 US dollars per month) to old residents and pensioners, who remain here for living [19, p. 60, 63], they "encourage relocation, actively create new infrastructure, and working and living conditions are more and more coming close to the standards of quality of life, peculiar to America's middle latitudes" [20, p. 13].

In Russia arctic territories need a financial mechanism for development, but only stabilization one is proposed [21, p. 129]. Arctic regions transfer to the federal budget more than they get transfers back; the level of fiscal capacity is less than the indicator average of Russia [22, p. 38]. And it is well known that inequality results in economic and demographic losses [23, p. 40]. Foreign companies use their technologies and local population for developing the Arctic. Our situation is rather different. In the attempt to reduce costs, companies of the extractive industry incline to attract foreign suppliers of machinery and equipment, and hire highly skilled foreign labor [24, p. 28].

As for the infrastructure, its lag is caused by the established practice of developing the North and the Arctic, which in the Soviet period was based on the social standards of the Gulag and did not provide creating normal living conditions for people [25, p. 90–95; 12, p. 14–15]. The attitude towards the North and the Arctic has been as to the "resource storage" during the royal and the Soviet time, and remains like that at present. The development of the social sphere was significantly lagging behind, and it has been carried out "quickly and carelessly". Huge spatial potential was not almost taken into account; those resources that could be sold without advanced processing have been used [26, p. 99].

Approaches to settlement of northern and arctic territories

First of all, it is necessary to define the goals and priorities of developing the arctic space. Today two opposing approaches have been formed. According to the *first approach*, the Arctic is considered as a source of natural resources, which makes preferential the rotational method of development while reducing the permanent population. The *second approach* declares the Arctic as a foothold of the innovative economic breakthrough, which allows to achieve sustainable development of arctic territories and to provide national security [27, p. 98–99].

Two approaches to spatial planning for the Arctic's development derive from this understanding of development priorities. *Rotational* one is used in "resource" regions having the lack of local labor resources or under the conditions of insufficient infrastructure saturation of the territory. It is focused on implementing primary advantages of arctic territories – the reserves of natural resources. The weakness of this approach lies in fixing of the region's specialization in extraction of raw materials, and unevenness of development and evolution.

Network approach (linear-nodal) is oriented toward the formation of large nodes in arctic agglomerations, which due to the agglomeration effect and high level of infrastructure development will be able to perform the role of a core in network structures of the economy. Concentration of labor in large nodes creates "the scale effect", and the rest of the territory acts as a raw material base (Russia, Norway – Svalbard archipelago, Denmark – Greenland). However, such organization leads to the outflow of labor and human potential outside the "cores" of resettlement [28, p. 98].

Taking into consideration the large territory of the Arctic and limited human resources within the resettlement of the population, *the intensive and extensive approaches* are applied. The first one involves the development of agglomerations and group resettlement systems, interconnected economically and by transport; the development of limited territories at the minimum of costs is observed. The *extensive approach* involves the formation of the developed resettlement system, covering as large territory as possible, creating the network of basic settlements, especially in border areas, taking into account the interests of the country's defense capacity [29, p. 8].

The resettlement system in the foreign Arctic is considered within the concepts of proximity and remoteness, the network approach, and the transport connectivity of settlements [30; 31]. The important feature is the presence of settlements at the edge [32] and rotational settlements [33, 34]. It is noted that the evolution of the resettlement system in the future will be influenced by climate changes taking place in the Arctic [35; 36; 37].

Thus, having considered the most commonly used approaches in the national and foreign practice, let us demonstrate their application in studying and analyzing demographic processes and the system of the population's resettlement in the World Arctic.

The population and demographic processes of the World Arctic

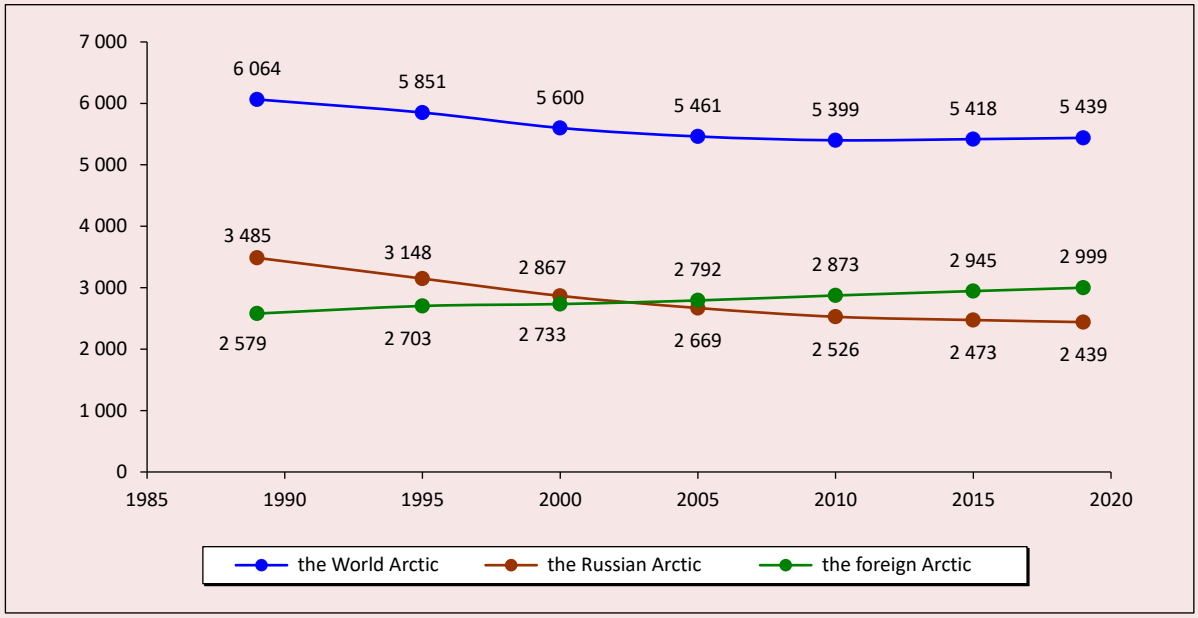
The research on demographic processes of the World Arctic has been reflected in the foreign academic literature [6; 7; 38]. The link between demographic processes, migration of the population and cycles of natural resources extraction has been noted [39; 40; 41; 42]. In recent years the number of publications regarding the socio-demographic characteristics of the population has been increasing [34; 43; 44].

Figure 1. The map of population density in the arctic territories at the beginning of 2019

Compiled by the authors according to the data from the official statistical agencies of eight arctic countries.

In the World Arctic, which occupies the eleventh part of the Earth's land, the population equals 5 million 438.5 thousand people, or 0.07% of the world's population. Such "scissors" between the indicators has made the Arctic the underpopulated territory – 0.41 people per sq. km. The least populated areas are Canada and Greenland – 0.03 people, the USA has 0.43 and Russia has 0.51 people per sq. km. *(Fig. 1)*. Therewith, the WA has produced 232.5 billion dollars of GRP, which comprises 0.31% of the world GDP [45, p. 15].

Figure 2. Population size of the World Arctic, 1989–2019, thousand people



Compiled according to the data from the official statistical agencies of eight arctic countries excluding the territories of Nunavik and Labrador in Canada. In order to evaluate the population size for the years having no available data, the method of proportional parts by neighboring values has been used.

The dynamics of population in the WA is determined by demographic processes taking place in the Russian Arctic. From 1989 till 2019 it has lost 1 million 46 thousand people, or 30% of the original population size. In the foreign Arctic, on the contrary, there has been an increase in the population size during all the years – from 2 million 579 thousand people in 1989 up to 3 million people in 2019, the increase comprised 420.5 thousand people, or 16.3%. As a result, the share of the Russian Arctic in the total population size of the WA has decreased from 57.5% in 1989 to 44.9% in 2019. In 1989 906.4 thousand more people lived in the Russian Arctic than in the foreign one, however, in 2019 the population size of the foreign Arctic began to exceed the size of the Russian one by 560.1 thousand people. The numerical superiority has been lost at the turn of 2002/2003. In general, the population of the WA has constantly decreased from 1989 to 2019 (from 6.06 to 5.44 million people, or by 625.6 thousand people, *Fig. 2*).

In the dynamics of the population size in the arctic states two opposite trends have been observed: the downward dynamics in the Russian Arctic and the ascending dynamics in the foreign one (Greenland and the Faroe Islands had diverse dynamics). The numerical losses of the Russian Arctic have comprised 1046 thousand people and could not cover the positive population increases of the arctic states: the USA – 202.2, Iceland – 105.1, Canada – 42.2, Norway – 28.9, Finland – 25.7, Sweden – 11.6, the Faroe Islands – 3.9 and Greenland – 0.8 thousand people. There is one more feature – in the arctic part of Canada, Iceland and the USA, the population growth rate has been ahead of the observed one in the country as a whole: 51.7, 41.7 and 37.8%; 38.5, 41.1 and 33.7%, respectively, which indicates the active settlement of the arctic territories.

However, the long dynamics of the population growth is fraught with the fact that visitors will replace local residents [46, p. 89]. The shares of population living in the arctic area are insignificant: they are minimum in the USA – 0.2, Canada – 0.3 and Russia – 1.7%, and maximum in Sweden – 5.0, Norway – 9.2 and Finland – 12.0%. In most countries they are declining, which has led to the decrease in the share of population living in the World Arctic as a whole: from 1.4 to 1.0%.

Let us consider indicators that reflect the similarity and difference in the demographic development of the arctic part and the country as a whole. The analysis the population structure by gender shows that in all foreign countries of the World Arctic, the share of males is more than 50% and upwards than in the arctic countries in general. In the Russian Arctic the share of male is the lowest – 48.0%, which could not help but affect the gender structure of the population in the WA, where it comprises 49.6%. The enhanced share of people of working age has led to the fact that in the World Arctic the demographic load on the working-age population is lower (775) than in the arctic

Table 1. Demographic indicators and population settlement rates of the World Arctic's countries and their arctic territories

Country	Population size at the beginning of the year, thousand people			Changes in population size during 1989–2019, %	The share of males, %	Demographic load per 1000 people of working age*		TFR, 2018	The share of indigenous population, %**	the ELE at birth, years***	
	1989	2000	2019			by the young	by the elderly			male	female
Arctic territories of the World Arctic	**6064.1**	**5600.4**	**5438.5**	**-10.3**	**49.6**	**349**	**426**	**1.71**	**7.5**	**73.0**	**80.4**
Russia	3485.2	2867.0	2439.2	-30.0	48.0	346	334	1.66	4.0	67.1	77.3
The USA	535.2	626.9	737.4	37.8	51.5	409	403	1.97	14.8	75.0	81.7
Finland	638.0	651.1	663.7	4.0	50.4	306	608	1.59	1.4	78.3	84.3
Sweden	509.1	514.8	520.7	2.3	51.0	336	619	1.69	3.9	79.8	83.4
Norway	460.3	466.7	489.2	6.3	50.9	325	527	1.54	11.4	78.9	83.4
Iceland	251.9	279.0	357.0	41.7	50.2	355	400	1.71	-	81.0	84.1
Canada****	81.6	93.3	123.8	51.7	50.8	382	285	2.09	53.3	74.1	78.2
Greenland	55.2	56.1	56.0	1.4	52.8	372	300	2.00	89.7	69.5	72.5
The Faroe Islands	47.6	45.3	51.5	8.2	51.7	437	510	2.48	-	80.1	84.8
Arctic countries in general	**444571**	**485940**	**541893**	**21.9**	**48.6**	**351**	**476**	**1.67**	**0.4**	**73.7**	**80.9**
Russia	147400	146890	146781	-0.4	46.4	337	467	1.58	0.2	67.8	77.8
The USA	246819	281422	329969	33.7	49.5	365	472	1.73	0.03	75.1	81.8
Finland	4964	5181	5523	11.3	49.4	354	635	1.41	0.2	78.6	84.2
Sweden	8493	8883	10324	21.6	50.3	358	537	1.75	0.2	80.6	84.1
Norway	4227	4478	5328	26.0	50.4	338	469	1.56	1.1	79.7	83.7
Iceland	252	279	357	41.1	50.2	355	400	1.71	-	81.0	84.1
Canada	27282	33477	37797	38.5	49.1	285	497	1.50	4.9	79.9	84.0
Denmark	5133	5330	5815	13.3	49.7	329	535	1.73	0.9	79.0	82.9

Compiled according to the data from the official statistical agencies of eight arctic countries: gks.ru, fedstat.ru, census.gov, stat.fi, scb.se, ssb.no, statice.is, statcan.gc.ca, stat.gl, hagstova.fo, statbank.dk. The World Arctic data is the average weighted value of arctic countries according to the population size.

* Finland and Canada: males – 15–59 years, females – 15–54 years; other countries: males – 16–59 years, females – 16–54 years.

** Russia – indigenous small nationalities of the North in 2010, the USA – the Indians and natives of Alaska in 2010, Finland – the Saami in 2009, Sweden and Norway – the Saami in 2017, Canada – the aboriginal population in 2016, Greenland – the Inuit inhabitants in 2018.

*** Norway – 2011–2015, Sweden – 2014–2018, Finland and Canada – 2015–2017, the USA – 2017, Denmark – 2017–2018, Russia and Iceland – 2018.

**** Yukon, Northwest Territories and Nunavut are taken into account.

countries as a whole – 827 per 1000 people. It is lower in Canada – 667 and in Greenland – 672, and it is quite high in Sweden – 955 and in the Faroe Islands – 947.

The relatively young age population structure in the Arctic provides the high fertility rate. If in the arctic parts the total fertility rate (TFR) comprises 1.71, then in the arctic countries as a whole it equals 1.67. The highest TFR has the Faroe Islands – 2.48, Canada – 2.09 and Greenland – 2.00. The lowest fertility rates are in Norway – 1.54 and Finland – 1.59. The TFR correlates with the share of indigenous residents in the population structure: where it is more than 15%, then the fertility is higher there.

The integral indicator of quality of life and public health, which is the expected life expectancy (ELE), in general is higher over the arctic countries, than in their arctic parts, excluding the females of Finland. This can be explained by gender differences in the ELE – they are more significant in the arctic territories, and here the overall mortality rate is higher. The highest life expectancy in the Arctic has the females of the Faroe Islands – 84.8, Finland – 84.3 and Iceland – 84.1 years. The high ELE among males has been noted in Iceland – 81.0, in the Faroe Islands – 80.1 and in Sweden – 79.8 years (*Table 1*).

Settlement of the World Arctic

The settlement of the northern and arctic territories from the standpoint of the descriptive and historical approach has taken place in the form of colonization. In addition to economic resettlement, colonization influenced the culture of nations. The specifics of the Russian colonization were manifested in the fact that the surplus population did not move to other countries, but to the remote areas of the Russian state. The Russian resettler did not feel himself like leaving the homeland [47, pp. 3, 6, 7]. The difference between colonization and resettlement lies in the fact that "resettlement is an act of private life, and colonization is of a state one" [48, p. 24].

The most critical prerequisite of the successful colonization is the state's right for the country's natural wealth, first of all, for the land. But in the process of settling the territories, inhabited by the aboriginal population, the necessity arises to reconcile opposing interests and to conduct the land policy in such a way as not to offend neither those, who want to preserve their land, nor the people, who want to acquire it [49, pp. 5, 6, 10]. In his works L.L. Rybakovsky considers in sufficient detail how the process of colonization has taken place in Russia, America and in other parts of the world [50, p. 38].

The colonization of the European North began in the 10-12th centuries with the entry of the Slavs to the underpopulated lands with the Finno-Ugric population (the Karelians, the Komi, the Nenets, the Vepses, and the Saami) and ended in the 17th century with the entry of the North to the Moscovite state. The accession of Siberia and the Far East took place from the end of the 16th and the beginning of the 17th centuries, and ended in the middle of the 19th century [51, p. 6]. Using the *demographic approach*, we can conclude that by the beginning of the 20th century the process of colonizing the Russian outskirts, including the Arctic, was completed. "In the stead of the main component of increasing the population size – the resettlement, comes another component – the natural population growth" [50, pp. 41–43].

Let us briefly consider the history of colonization in the foreign Arctic. In the Northern Norway it began in the early Middle Ages, in the Viking era. The Norwegian North has undergone the accelerated transition from the

old community life and "the welfare state" to the rigid market relations. Today the future of the country is connected with the oil and gas industries [46, pp. 77–78, 90]. The colonization of Alaska occurred in the middle of the 18th century by the Russians. The trade and field activities were the form of cooperation with the local population. Coal mining began in the 19th century. In 1867 Alaska was sold to the USA, and then there were gold and copper rushes. In 1930–1950s the military construction was actively carried out. In general, it contributed to the sharp increase in the population size.

The first Europeans appeared in the Canadian North in the 9–10th centuries, but until the middle of the 18th century the process of settlement was weak, only the occupation of Canada by England accelerated the entry of the Europeans to the Canadian North. In the 20th century the military construction and the availability of natural resources gave the impetus to the settlement process [52, pp. 22–41, 129–133]. In the 21st century the process of consistent settling the WA, and forming the network of permanent settlements and the pattern of resettlement has continued. The main economic interest of all countries in the World Arctic belongs to energy resources.

There are some features of territories' development peculiar to both the Russian and foreign Arctic: the rise in prices of the most types of activities; spatial unevenness and discontinuity, low population density and infrastructure location; small amount of settlements. O.M. Blagodeteleva describes in sufficient detail the stages and specifics of forming the settlement systems in the World Arctic [20, p. 8].

For the Russian Arctic the vector in population resettlement for the long term is defined by the "General Resettlement Scheme on the territory of the Russian Federation". It proposes a number of principled ***approaches***:

– "not to form permanent settlements in places with unfavorable medical and geographical conditions, therefore, it is proposed to make a transition from the policy of residence to the policy of presence for non-indigenous people;

– to develop large urban settlements – basic centers of the population's residence, to concentrate residents in the promising settlements with a stable socio-economic base, not to create new small settlements, and to introduce more widely such method of labor organization as the work on a rotational basis;

– it is recommended to cut growth of cities as much as possible; to ensure the rigorous selection of people arriving in the northern districts according to their occupation and health status; the gradual transition to implementing the planned shifting of workers;

– to overcome the increasing stagnation of small and medium urban settlements, which determine the economic and social life of surrounding rural areas"[6].

The modern settlement system has been formed by the industrial nature of developing the Arctic, which determined the increased share of the urban population in it and the specifics of arctic urbanization [53, p. 40–45]. However, when assessing the level of urbanization, we are faced with the existing methodological difficulty of classifying settlements as urban ones. In most countries the population size serves as the criterion for having the status of a city. The UN proposes to accept the population size of 2 thousand inhabitants as a lower bound, which does not cancel the national specifics. So, in Norway settlements having 5 thousand inhabitants and more, are referred to cities, in the USA – 2.5 thousand

[6] *General Resettlement Scheme on the territory of the Russian Federation* (approved by the Government of the Russian Federation, the record no. 31 dated December 15, 1994).

and more residents, in Sweden, Iceland and Denmark – 200 and more inhabitants [54, p. 65]. In Russia, the residential area with a number of inhabitants no less than 12 thousand is considered a city, but there are some cities having smaller population size. In the Russian Arctic along with cities there are urban-type settlements as a transitional form between the real cities and rural settlements [55, pp. 10–11]. The diversity of approaches makes it difficult to compare the degree of the arctic territories' urbanization.

Two opposite trends have emerged in the development of settlements: the number of the smallest residential areas having the number of inhabitants up to 5 people is increasing with simultaneous concentration of the population in large settlements, having over 5 thousand inhabitants [56, pp. 9–10]. Today the world statistics take into account settlements having the number of inhabitants over one thousand people, which narrows the information base.

In the World Arctic there are 416 settlements having the population size more than a thousand people[7]. Among them 34.9 are located in Russia, 13.9 in Sweden, 13.7 in Finland, 12.5 in Norway, 8.2 in Iceland, 6.7 in the USA, 5.3 in Denmark and 4.8% in Canada. The density of settlements in the WA is very low – 0.32 settlements per 10 thousand sq. km. The vast majority of them have the population size up to 5 thousand people – 71.6%, from 5 to 10 thousand people – 11.8, from 10 to 20 thousand people – 8.4, over 20 thousand people – 8.2%. The highest share of settlements having the number of residents up to 5 thousand people is in Denmark – 86.4 and Canada – 85.0; the lowest one is in Russia – 66.2 and the USA – 60.7%. The maximum population of settlements in the USA comprises 16688 people and 15944 people in Russia, and the minimum one is in Canada – 4281 people and in Denmark – 3472 people.

The most part of the WA's population lives in settlements, having up to 50 thousand people – 3 million 213 thousand residents (59.1%), and in Iceland the number of this group comprises 215.1 thousand people (63.6%). In Finland 358.1 thousand people live in settlements having the population size up to 20 thousand residents (53.7%). In the USA and Sweden half of the population lives in small settlements, having the population size up to 10 thousand people – 378.1 (51.0%) and 275.0 (53.2%) thousand residents, respectively. In Norway, Canada, Greenland and the Faroe Islands the population is concentrated in small settlements (up to 5 thousand people) – 404.9 thousand people, or 24.5% from the total population of the World Arctic living in such settlements (*Table 2*).

In 2017 in the World Arctic there were 15 cities, having the population size more than 50 thousand people, among them 9 cities are located in Russia, 5 – in Western Europe, and 1 – in the USA. The largest arctic cities of Russia – Arkhangelsk (351 488 people), Murmansk (298 096), Severodvinsk (183 996), Norilsk (178 018); the USA – Anchorage (298 192 people – 40.2% from the total population of Alaska); Finland - Oulu (198 358 – 29.8% from the urban population), Rovaniemi (52 481); Iceland – Reykjavik (123 246 – 36.4% from the urban population); Sweden – Umea (87 238); Norway – Tromse (64 448). A number of countries have only small cities: in Canada – Whitehorse (25 085 people) and Yellowknife (19 569); in Greenland – Nuuk (17 796) and in the Faroe Islands – Thorshavn (13 130).

[7] The data on the number of the Russian urban settlements is obtained from the Rosstat bulletin regarding the population size of the Russian Federation according to municipal entities (http://www.gks.ru/free_doc/doc_2017/bul_dr/mun_obr2017.rar), rural ones – from the results of the All-Russian Population Census conducted in 2010, foreign settlements – from the website http://www.citypopulation.de, aggregating the data of the national statistical agencies from different countries.

Table 2. Distribution of population in the World Arctic, %

Country	Population size, in total	In particular according to the settlements with a number of inhabitants						
		up to 1000	1000–4999	5000–9999	10000–19999	20000–49999	50000–99999	100000 and more
The World Arctic	**100.0**	**18.2**	**12.2**	**6.3**	**10.4**	**12.0**	**6.8**	**34.1**
Russia	100.0	5.9	9.0	3.9	11.3	13.0	6.8	50.1
The USA	100.0	37.0	5.9	8.1	-	8.8	-	40.2
Finland	100.0	24.9	11.5	10.1	7.2	8.6	7.9	29.8
Sweden	100.0	26.7	19.9	6.6	13.6	16.3	16.9	-
Norway	100.0	37.7	17.2	9.4	14.2	8.3	13.2	-
Iceland	100.0	4.8	17.6	7.5	14.8	18.9	-	36.4
Canada	100.0	29.1	27.5	6.4	16.2	20.8	-	-
Greenland (Denmark)	100.0	17.5	40.8	9.8	31.9	-	-	-
The Faroe Islands (Denmark)	100.0	39.2	34.5	-	26.3	-	-	-

Compiled according to the data from the official statistical agencies of eight arctic countries. The data is presented on urban settlements of Russia at the beginning of 2017, rural ones – according to the census of 2010, the USA and Canada – in the middle of 2016, other countries – at the beginning of 2017.

Considering the dynamics regarding the population size of large cities during 1989–2017, it can be noted that in all cities of the foreign Arctic there has been an increase, and in the Russian one – only in 2 cities out of 9 (Noyabrsk and Novy Urengoy). The largest decline in residents is recorded in Vorkuta, Monchegorsk, Murmansk and Apatity. It is important to preserve cities, because they are the poles of economic growth; "binding transport hubs; important information, research and cultural centers for surrounding areas" [45, pp. 12–15; 57].

The following conclusions can be drawn from the material mentioned above:

1. Despite the fact that in most works and policy papers the preference is given to the method of working on a rotational basis, it should be noted that core or basic cities are needed for the development of the rotation shift [58, p. 25-30]. They can be cities that have been successfully functioning for more than a decade under the conditions of the North and the Arctic. For example, for all oil fields in Siberia, the basic one is the city of Tyumen, and the city of Mirny, in addition to servicing oil fields, supplies rotation shifts to diamond fields [24, p. 27]. In the Komi Republic such a city is Usinsk; Vorkuta and Inta can become them as well.

2. The need to maintain the network of permanent settlements is related to the geopolitical approach: 1) in order to confirm its sovereignty in the Arctic, it is necessary to have the constantly living population there, which is adapted to local climatic conditions [27, p. 100], 2) to bet on medium and small cities, because agglomerations attract the population, bare the surrounding area, make them "no one's", tempting lands for other states, 3) it does not seem advisable to transfer the formed cities to the category of rotational ones both for technological and social reasons [59, p. 7–8].

Conclusions

Attention to the World Arctic has steadily grown over the past hundred years and will continue to rise due to the natural wealth. Despite the increased interest of the governments of the arctic states, the presence of strategic plans, significant investments, many problems have not been solved yet and require their new interpretation and understanding. As in the previous period, the approach

to cost minimization maintains. Taking this into account, the following approach to the settlement of the Arctic is proposed: to make a transition from the policy of residence to the policy of presence regarding the arriving population, under especially extreme conditions, to use the method of working on a rotational basis as much as possible.

Still there is no joint point of view on how to settle the Arctic. Supporters of the intensive approach propose to develop the Arctic pointwise, creating large agglomerations, and group resettlement systems, which reduces costs. From the perspective of the geopolitical and extensive approaches, it is necessary to form the resettlement system that maximally covers the border arctic space.

The experience gained in the process of developing the North and the Arctic shows that the significant part of small and medium settlements with depletion of the resource base will cease to exist, because they do not have any options for changing specialization. The mining city of Inta can be mentioned here as an example. In the best case scenario, some of them can become the basis for the intraregional rotation shift, if the corporate interest in using the rotational and expeditionary method is not prevalent[8].

In the World Arctic there has been observed the following peculiarity in developing demographic processes: in the foreign Arctic – the ascending dynamics of the population size, in the Russian – the downward one, which decreases already low population density of the territory. This has led to the fact that according to the population size the foreign Arctic started to exceed the Russian one by 0.5 million people. In the Arctic the age structure is younger, the demographic load is lower, and the ELE is quite high. In a number of arctic countries, the TFR almost provides a simple reproduction of the population.

The North and the Arctic are highly urbanized. In the Russian Arctic the advanced resettlement system has been formed, including the cities having different population size, the full-fledged infrastructure, and transport has been developed. At first, the foreign Arctic was developing by the rotational and expeditionary method with few settlements of narrow specialization, but over the past decades there has been an increase in urban settlements with the advanced infrastructure, which does not differ from the main part of the country.

The contribution of this article to the research of the problem under study lies in the fact that one work summarizes almost all known approaches to studying demographic problems and settling of arctic territories. The proposed approaches used in analyzing demographic problems and considering the resettlement features of the entire World Arctic can be referred to the elements of novelty. In the future it is necessary to study the experience of solving demographic problems and settling the population in the World Arctic.

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Influence of Health Status on Social Activity of Older Population*

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Abstract. The economy suffers losses not only because of premature death but also due to poor health. It may lead to complete, or partial, loss of working capacity and the decrease of social activity. These problems affect all population groups, but it is the most common among older citizens. This situation requires the implementation of measures to maintain health and stimulate the efficient usage of older people's labor potential. In this regard, the purpose of this article was to analyze the impact of health status on social activities of older population. The information base of the study included data of monitoring concerning the quality of labor potential among population of the Vologda Oblast for 2018. Methodological aspects of the study are based on the concept of population's qualitative characteristics and the index approach, which was used to assess the status of health and social activity. It is shown that people who belong to older age group, in comparison with other groups, have low values of the need index

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concerning the achievement and social activity. In all selected age groups, lowest values of social activity were observed in cases when two conditions were simultaneously met: they were lower than median values of the physical health index and, for example, cognitive and creative potentials. It is revealed that social activity is higher in cases when indices of cognitive and creative potentials exceed the median level, but the physical health index, on the contrary, does not reach it. It indirectly characterizes the important role of cognitive and creative aspects in ensuring high social activity. The study determined that population of older age group has a competitive advantage which concerns a sufficiently high level of cognitive and intellectual potentials that partially compensate for low physical and mental health. It is shown that, in comparison with other studied age groups, the "loss" is insignificant in material terms, and the "loss" in labor productivity was not recorded at all.

Key words: older population, health, social activity, need to achieve.

Relevance of the research

According to the World Health Organization, a number of the world's population, aged 60 years old and above, is projected to grow to 2.03 billion people by 2050[1]. Its increase leads to the need to pay closer attention to problems like a low level of inclusion in public life, a low level of financial security, and the deterioration of health conditions[2]. In the last group of problems, there is the increase of the share of older population with various types of disorders, such as somatic, functional, psychological, or cognitive disorders [1].

Despite these problems, older population has a significant resource: a high educational and qualification level, as well as professional and life experience. To efficiently use the potential, it is necessary to create conditions for increasing the demand for older people in society and the economy, at the same time promoting their active longevity [2, p. 5].

In 1982, the UN General Assembly developed a policy concerning older people aimed at creating opportunities for their self-realization by involving them in various spheres of public life [3, p.49]. Similar provisions can be found in various programs, such as "Society for all ages"[3] or "Active ageing"[4]. Key provisions of these programs are related to improving the quality of life of older population and increasing their social activity [4; 5]. It involves measures to maintain health, to promote the participation of older people in public and cultural life, and to empower them (Madrid International Plan of Action on Ageing, 2002[5]).

Similar provisions could be found in Russian institutional environment. For example, "Strategy of Actions for the Benefit of Senior Citizens in the Russian Federation up to 2025". Its implementation plan for 2016–2020 included paragraphs on active involvement of older people in public life.

A possibility of the implementation of such measures is indicated, for example, by available sociological data of the "Obshhestvennoe mnenie" fund. In accordance with it,

[1] *Report on Ageing and Health*. Geneva: World Health Organization, 2015. 260 p.

[2] *Global Age Watch Index 2015 Insight report*. London: HelpAge International, 2015. 25 p.

[3] *Building a Society for All Ages: Official Report*. Presented to Parliament by the Secretary of State for Work and Pensions. July 2009. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/238574/7655.pdf

[4] *Active ageing*. Geneva: World Health Organization, 2002. 57 p.

[5] *Madrid International Plan of Action on Ageing*. Adopted by Second World Assembly on Ageing. Madrid, April 8–12, 2002.

almost every third person above 50 years old participates in volunteer practices[6] – a form of social activity [6, p. 50]. At the same time, according to Institute of Sociology of RAS, approximately 12–13% of Russians are socially excluded [7]. Within demographic ageing, more and more older people are exposed to such risks – up to one fourth part of population, according to official statistical data.

Certain consequences of social isolation, according to British researchers (A. Steptoel, A. Shankar), include lonely old age, increased risk of death (26% more often than people who continue to lead an active life) [8]. Similar conclusions are presented in earlier works (for example, [9, 10, 11]), which include arguments for a statistically significant connection of social activity with morbidity and mortality. In turn, the increase of the level of social activity and the improvement of the quality of social relations between individuals and population groups may lead to the increase of the positive effect of programs to improve public health [11].

Aforementioned aspects actualize the need to investigate the way a health status of population (in older ages too) affects social activity.

Overview of studies on the topic

Members of different theoretical areas define social activity differently depending on goals and objectives of a particular science [12], which also determines the variety of approaches to the study of this phenomenon. From a sociological point of view, social activity is characterized by "self-activity, which manifests itself in various spheres of life" (economic, including labor, cultural, etc. [13]). An individual, a social group, and a society can act as a subject of actions; group and general social effects can act as the results[7]. From a standpoint of the psychological approach, the emphasis is placed on "individual or group actions that contribute to changing a "social self", a place of a person in a society" [14; 15]. Another approach presented in the scientific literature – activity – involves considering "a set of forms of activity that allow solving problems a society faces, a social group in a given historical period"[8]. It is emphasized that social activity leads to changes of external environment and social characteristics of an individual. It often refers to the potential of an entity, the degree of the formation and implementation of certain socially significant qualities.

In addition to these, the approach, associated with all manifestations of activity that determine a person's involvement in social relations, regardless of the degree of their awareness and orientation, has become widespread. In another one, on the contrary, the emphasis is placed on conscious attitude of an individual to surrounding social reality, which is associated with its activities [16]. In the latter case, along with everything aforementioned, it is about aspects like self-movement, self-regulation, and self-development [17]. Among the examples of phrasings within the first approach, there are ones in which social activity is defined as "any operation" (Yu.I. Bykov, V.N. Vyuzhanin, G.S. Grigoriev), within the second one – as "a special form of activity" (G.S. Arefeva,

[6] Report on the project of the "Obshhestvennoe mnenie" fund *"Resource of the vanguard groups voluntary movement for Russian modernization"*. Available at: http://soc.fom.ru/uploads/files/dobrovolchestvo/Otchet_dobrovolchestvo.pdf (accessed: January 20, 2020).

[7] Kravchenko S.A. *Sociologicheskiy enciklopedicheskiy russko-angliiskiy slovar.* Moscow: Astrel; AST; Tranzitkniga, 2004. 501 p.

[8] *Sociologicheskiy enciklopedicheskiy slovar': na rus., angl., nem., franc. i chesh. yazykah.* Ed. by RAS acad. G.V. Osipov. Moscow: NORMA, 1998. P. 10.

V.D. Shapiro) [18]. We adhere to provisions of the second approach, because we consider it inappropriate to identify social activity with an operation. Accordingly, we share the position of those researchers who characterize social activity in the same way. For example, as the highest form of human activity, as an ability to act consciously [19] – not just to adapt to surrounding reality but change it themselves[9].

Taking into account everything mentioned, we would like to emphasize characteristics that, one way or another, appear in various definitions of a social activity. It includes *self-determination*, expressed as a conscious, internal motivation for such activity; *inclusion in social interaction*, which is shown by the awareness of the interconnection with a society and in the construction of ways to interact with it; *prosociality*, which involves the transformation of a society and an individual [20].

Together with the social activity concept, it is possible to speak about its types, which, in turn, may expand the content of the latter. Criteria for its identification include the duration, coverage scope, source of the initiative, sphere of implementation, and subject [21; 22]. General and search activity (within a psychological approach)[10] becomes widespread: the former is related to a person's temperament, and it implies his/her natural activity/passivity; the latter is related to the focus on changing the existing situation and attitude toward it – at the same time, there is not always a prediction for the results of such activity[11]. Types of social activity are also determined according to stages of socialization: the primary one assumes "tightening of various levels of social and cognitive development" [23; 24], and, within the secondary one, maintenance of health and other parameters among older population [25]. The relevance of reviewing social activity in such context is explained by the preservation of controversial issues. It concerns, for example, the lack of unambiguous results regarding the evidence of a direct connection between cognitive aspects and social activities at the stage of secondary socialization [26].

Social activity is also distinguished by such criteria as the sphere of implementation, paying attention to volunteer, creative [26; 27; 28], socio-political activity (involvement in various organizations – a party, a trade union, councils) [29], etc. In this series, one of the most important types is social activity of population in the labor market, related to employment, primary and additional employment of enterprises' employees, the growth of their skills, etc. Through this activity, prerequisites for reducing unemployment, social differences, poverty, improving the level and quality of life of different population groups, and creating a fairer, in social terms, society are created [30]. Labor activity is considered from the point of view of implementing the labor potential. It depends not only on the accumulated stock of knowledge, skills, and abilities but also on conditions, created for its implementation during labor activity, to improve the efficiency of workers [31].

The evolutionary approach to the issue of labor activity allows us to distinguish several stages: there is an interest in this issue and the attention is drawn to various accentuations of labor activity. In particular, in the 20–30s of the XX century, the attention of researchers was focused on the study of macro-level factors

[9] *Enciklopedicheskiy slovar.* Saint-Petersburg: Brokgauz-Efron, 1890. P. 7.

[10] Shhukina G.I. *Aktivizaciya poznavatel'noi deyatel'nosti v uchebnom processe: ucheb. posobie dlja stud. ped. institutov.* Moscow: Prosveshhenie, 1979. P. 34.

[11] Bashaev N.N. *Rol fizicheskogo vospitaniya v formirovanii social'noi aktivnosti studentov*: diss. ... cand. ped. sci. Leningrad, 1979.

that affect labor activity of workers; in the 1960s–1980s, on the contrary, real problems of labor activity in the field of labor relations and issues of motivation for such activity were studied; in the 1990s, emphasis was put on the study of labor activity and motivation by privatized enterprises, entrepreneurship. Since the 2000s, new areas, related to the study of social activity in the labor market, have been actively formed, including economic sociology, market sociology, and labor market sociology [30, p. 11–13].

Studies on this topic address issues of labor activity among various population groups: for example, young people and older population. The place and role of the latter in the Russian society, the influence of its socio-demographic features on participation in labor and public activity, concepts of an individual's social behavior at an older age is analyzed in the works [32, 33], etc.; factors of older population's social well-being, problems of activation of their behavior are reviewed by A.V. Dmitriev, N.G. Kovaleva [34; 35], etc.

In the scientific literature, issues related to the increase of the frequency of diseases among older people, the decrease of their professional and social status that may lead to depressive states [36], which negatively affect the ability to work and social activity in general, remain relevant. The increase of health problems, associated with the emergence and development of a number of functional limitations, in addition to aforementioned ones, leads to the situation that certain population groups may lose mobility, their quality of life may reduce [37; 38], as well as satisfaction with it [39], social well-being and social activity may negatively change [40].

The deterioration of health among older people may negatively affect work and social activity. Nevertheless, they retain intellectual potential, competence, and efficiency, which, on the contrary, have a positive impact [41]. Within the organization of continuous learning throughout life, this group of people has more opportunities to adapt to changes and participate in social development. In turn, the implementation of labor activity allows older population to financially support themselves, to increase the sense of security and satisfaction with the results of their work [42].

Despite the existence of research in this area, the analysis of scientific sources allows us to conclude that there is insufficient work concerning issues of social well-being among older people, consideration of them not as objects of social protection but as subjects of social activity, and study of methods of increasing such activity [43]. It is also about the lack of a clear understanding of how this activity changes among older people, what forms it takes [44, p. 264]. Taking into account everything aforementioned, the study will focus on the analysis of aspects related to the health status, cognitive potential, and other qualitative characteristics of older population and its impact on social activity.

Purpose, objectives, characteristics of the study's information basis

The purpose is to analyze the impact of the health status of older population on social activity.

Objectives:

– study of self-assessment of health status and occurrence frequency of ailments of various severity within selected socio-demographic population groups;

– study of the influence of population's health status on integral indices of social activity and qualitative characteristics of population;

– study of the influence of individual components of the integral index of population's qualitative characteristics (including physical and mental health) on social activity within age groups;

– study of the impact of health status on individual characteristics of the usage of accumulated potential (including productivity and remuneration) and reasons for concerns over job losses in age groups with different self-assessment of health.

The information basis includes data of the next stage of monitoring of quality of labor potential in the Vologda Oblast, conducted by FSBIS VolRC RAS in 2018. The sample is quota-based with proportional placement of observation units; its volume is 1500 able-bodied people (16–59 year old men; 16–54 year old women) in Vologda, Cherepovets, and eight districts of the Oblast. The representativeness of the sample is provided by the maintenance of proportions between urban and rural population, between residents of various types of localities (rural settlements, small- and medium-sized cities), the gender and age structure of adult population of the Oblast, and proportions between employed, unemployed (registered at the labor exchange) and economically inactive population (students, housewives, and other unemployed). The value of random sampling error is 3–4% with a confidence interval of 4–5%. The survey method is a questionnaire in a respondent's place of residence. Questionnaires were processed in the SPSS program (Statistical Package for the Social Sciences).

Methodological aspects of the research

Drawing attention to methodological aspects of the study, which were a basis for the solution of set objectives, we highlight two aspects that are relevant for the assessment of *health* and *social activity*, respectively.

In the first case, we would like to note that, *in order to assess the state of health*, we used separate *indicators of self-assessment of health and frequency of diseases of various severity (a questionnaire did not include questions about any specific diseases)*, as well as *integral indices of physical and mental health*. The latter indices are used by researchers of FSBIS VolRC RAS as a part of an integrated methodology for assessing qualitative characteristics of population.

Drawing attention to the issue of the usage of individual indicators for assessing health status in the scientific literature, we would like to note that it is currently debatable and requires justification (Currie, Madrian, 1999). For example, there are arguments in support and against self-assessment of health status. *Among the latter, there are arguments about the absence of 100% correlations with real state of health due to measurement errors*. People forced to work less tend to make more critical assessments of their health; individuals with higher income levels, who have access to regular healthcare services with high disease detection, are also likely to have more critical assessments. In addition, self-assessments of health status may be influenced by gender. These aspects should be taken into account while using this indicator: in particular while interpreting the obtained results. *Among the first ones, there are arguments to support the fact that self-assessment correlates with the state of health according to medical indicators* [45] and, in some cases (for example, while finding the probability of a fatal outcome), it is a "reliable" indicator together with objective indicators. Among domestic researchers, a similar position is shared by, for example, academician of the Russian Academy of Sciences, doctor of sociological and medical sciences A.V. Reshetnikov [46]. He notes that respondents' assessment of their health is close to objective, and, in 70–80% of cases,

it corresponds to data of medical records. We would like to note that, depending on objectives of the study, various indicators may be used (for example, the presence of chronic and other diseases, the presence of any work limitations due to health, etc.). However, parameters associated with self-assessment of health and morbidity are the most common. They will be used in our study.

As noted above, the study also used integral indices of physical and mental health, which are used by employees of FSBIS VolRC RAS to analyze the quality of population's labor potential. The analysis of the latter is based on the concept of population's qualitative characteristics with a multi-level system of components of labor potential. The lower (first) level characterizes a person taking into account his natural basis (physical health, mental health, knowledge, and creativity) and involvement in social relations (sociability, morality, social claims, culture). At the intermediate (second) level, characteristics are generalized to four groups of basic qualities: psychophysiological, intellectual, and communicative characteristics and social activity. At the third level, characteristics are generalized to two components (energy and socio-psychological potentials). The integral quality of labor potential – social capacity – is a combination of properties that determine the effectiveness of labor activity in specific social conditions [47, p. 730].

Taking into account provisions of this concept, as well as the purpose and objectives of the study, special attention was given to indices[12] of physical and mental health of population. The first index was calculated as the arithmetic mean of three particular indices that characterize the severity and frequency of morbidity; the impact of health on the performance of life functions; respondents' self-assessment of their health. The second index, which characterizes the ability of the psyche to perceive external stressors without deformations, was calculated using the Likert scale consisting of statements with rating scales of assessment depending on the degree of agreement of a test subject with proposed respond options [48, p. 23–24].

Within the second aspect of the study, related to *the assessment of social activity, the index method was also used. The index of social activity was calculated as the geometric mean of indices of morality and the need for achievements.* The general index of morality was evaluated using two scales as the arithmetic mean of indices of moral feeling and moral values, the former of which characterized the attitude toward the violation of generally recognized norms, and the latter characterized the system of moral values of an individual. In turn, the need for achievements was analyzed by evaluating respondents' life plans related to improving their social status [48, p. 25–26].

In addition to social activity as such, the study drew attention to labor activity being a type of social activity. Among the parameters, which were taken into account while conducting the analysis, there were employees' scores of average labor productivity within groups selected according to age and health

[12] In addition to two indicated indices (physical and mental health), the work used indices of population's cognitive and creative potentials. Cognitive potential (erudition) is the sum of knowledge about the surrounding world measured using two scales. One of them characterizes a respondent's activity aimed at constant update of knowledge about all social spheres surrounding him / her. The second scale complements the first one and characterizes the attitude of a society to knowledge. It represents ten judgments about knowledge, a half of which is positive, and the second half is negative. The cognitive potential index is calculated as the arithmetic mean of indices for each of two scales. The assessment of creative potential is also carried out using two scales, one of which characterizes a respondent from a point of view of creative activity – in the professional sphere and everyday life, and the other – a respondent's attitude to creativity. The overall creative potential index is calculated as the arithmetic mean of indices according to these two scales.

status; average monthly wages over the past 12 months; the presence/absence of concerns over job loss, as well as reasons of such concerns. In addition, we took into account parameters related to certain qualitative characteristics of population, which collectively characterize the accumulated potential and may have an impact on labor activity.

Results of the analysis

The first stage of analyzing the impact of health status on social activity was the study of self-assessment of health status, within socio-demographic groups of population too. Due to the small number of extreme groups that differ in health status, it was decided to expand them, to take into account total population with "excellent", "good", "bad", and "very bad" health. For a similar reason, extreme groups according to education, income level, and other indicators were also reviewed in total.

Coming back to the results of self-assessment of health status within selected socio-demographic groups, we would like to note that men tend to characterize their health as excellent and good more often, and, on the contrary, they rarely give satisfactory ratings in comparison with women. In the population group with people aged above 50 year old, more than 60% of respondents satisfactorily assessed their health, while slightly more than 20% of respondents assessed their health as excellent and good. The situation was different in the polar group – 70% of respondents said that they had excellent and good health, while almost every fourth person called it "satisfactory" (*Tab. 1*).

Self-assessment of health status differs in other ways too. For example, according to the educational level. In almost 50% of cases, those who have incomplete secondary and secondary education have a satisfactory state of health, and good and excellent health in 40% of cases. The opposite situation is observed among population with higher and incomplete higher education.

In terms of marital status, there is also a difference. Divorced people and widows (widowers) are those who very rarely assess their health highly. At the same time, unmarried (single) people and those who are not in a registered marriage, in more than 50% of cases, assess their health as excellent and good.

In polar groups according to purchasing power of income, there are also differences in health status. It is not a surprise that, among those who are used to not denying themselves anything, excellent and good assessments happen in more than 60% of cases, while satisfactory ones occur in every third case. If we look at the population group focused mainly on the purchase of food, then only one person out of three has excellent and good health.

Depending on the nature of employment – among non-workers, who get by with odd jobs, and those who have only a main job, in almost half of cases, they have excellent and good health ratings. In other groups, identified by this indicator, such estimates are less common.

Health status may be indirectly indicated by the frequency of diseases, which was analyzed within age groups. Among working respondents, whose age exceeds 50 years, in comparison with young people, minor ailments are more common (38% vs. 19%), as well as diseases that lead to the loss of the ability to work (*Tab. 2*).

One of research tasks was to analyze the impact of health status on integral indicators that characterize social activity and population's qualitative characteristics[13]. Obtained results show, first of all, that the lowest values of these integral indices were among older respondents (0.650 and 0.563 units, respectively), while the opposite situation

[13] We would like to note that the quality of accumulated potential was studied using the integral indicator "need for achievements".

Table 1. Self-assessment of health status of working respondents depending on different characteristics in the Vologda Oblast, % from the number of respondents

Socio-demographic groups of working respondents		Evaluate, in general, your health status		
		Excellent; good	Satisfactory	Bad; very bad
Category's size, people		556	534	68
Gender	Male	50.2	43.7	6.1
	Female	45.4	49.0	5.6
Age	under 29	70.8	27.5	1.7
	30–49	49.1	46.6	4.3
	50 and older	22.3	63.2	14.5
Education	Incomplete secondary; secondary school, including vocational schools with secondary education	40.0	51.4	8.7
	Specialized secondary education (technical college, etc.)	48.9	45.6	5.5
	Incomplete higher education (at least 3 university courses); higher	56.6	40.4	3.0
Marital status	I am in a registered marriage and live together with my husband (wife)	46.5	48.5	5.1
	I am not in a registered marriage but I live together with my husband (wife)	54.8	41.3	3.8
	I am not in a registered marriage and do not live together with my husband (wife). (divorced); I am in a registered marriage and do not live with my husband (wife)	38.2	48.8	13.0
	Not married (single)	58.8	37.4	3.7
	Widow (widower)	35.3	50.0	14.7
Income purchasing power*	Enough money to not deny anything; purchase of most durable goods (refrigerator, TV) does not cause difficulties. However, purchase of a car is not currently possible	65.1	30.2	4.8
	Enough money to purchase necessary products and clothes. However larger purchases have to be postponed	52.5	43.5	4.0
	Enough money to buy only food; not enough money to buy even food, we have to get into debts	33.2	56.7	10.0
Social self-identification**	Rich; middle-class people	57.7	39.2	3.1
	Poor; indigent	39.7	51.7	8.6
Employment	I only work at my main job	49.4	45.4	5.2
	I have a main and additional job	43.2	49.6	7.2
	I combine my main job with odd jobs	40.9	50.0	9.1
	I do not have a main job. I get by with odd jobs	48.1	44.3	7.6
	I do not work (including parental leave, etc.)	49.4	45.4	5.2

* Phrasing of a question: "Which following assessments most accurately describe your cash income?"
** Phrasing of a question: "What category do you belong to?"
Source: data from monitoring of the quality of labor potential among the Vologda Oblast's population, FSBIS VoIRC RAS, 2018.

Table 2. Frequency of diseases of various severity among working population of the Vologda Oblast, % from the number of respondents

Age group	Frequency of diseases			
	very often	quite often	once a year or less	never
Ailments that reduce the ability to work normally but do not require a sick leave				
under 29	3.8	19.2	45.4	31.7
30–50	6.8	27.1	41.4	24.7
50 and older	10.7	38.4	33.5	17.4
Diseases that lead to the loss of the ability to work in production and to study but do not deprive of the opportunity to engage in self-service, do household chores, cook food				
under 29	1.7	5.4	38.3	54.6
30–50	2.4	12.0	36.7	49.0
50 and older	3.3	16.5	44.2	36.0
Source: data of monitoring of the quality of labor potential of the Vologda Oblast's population, FSBIS VoIRC RAS, 2018.				

Table 3. Average values of indices of social activity and need for achievements among working population with different self-assessment of health status in the Vologda Oblast

Working population	Average value of social activity index, un.			Average value of the need for achievements index, un.		
	under 29	30–50	50 and older	under 29	30–49	50 and older
Average among working population	0.723	0.703	0.650	0.688	0.653	0.563
Assess, in general, your health status						
Excellent; good	0.741	0.738	0.681	0.701	0.692	0.603
Satisfactory	0.676	0.673	0.648	0.650	0.620	0.562
Bad; very bad	0.710	0.607	0.609	0.724	0.559	0.503

Note: social activity index is a part of the need for achievements index.
Source: data of monitoring of the quality of labor potential of the Vologda Oblast's population, FSBIS VoIRC RAS, 2018.

was observed among employed young people (0.723 and 0.688 units; *tab. 3*).

If, in addition to aforementioned, we take into account the state of health[14], it turns out that older workers with poor and very poor health have lower indices of social activity and need for achievements than average indices' numbers in this age group (0.609 units vs. 0.650 and 0.503 units vs. 0.563, respectively). In two remaining age groups, indices' values do not differ much not only among their representatives with excellent and good health but also with satisfactory health. However, in case of polar age groups with poor and very poor health, there was the greatest difference in indices' values.

It should be noted that impact of the population's health status on social activity, need for achievements and, for example, on cognitive and creative potentials is studied in the paper.

The table below shows average values of social activity index in each age group for different combinations of physical health index values (high and low), taking into account mental health, cognitive and creative potentials. It was revealed that the smallest difference in values of social activity index, taking into account physical and mental health, cognitive and creative potentials is achieved in the older age group. Such results, for example, were obtained while comparing average values of social activity in population groups with mental health lower and higher than a median one (differences in social activity in these groups reach 0.002 units among older population vs. 0.016 units among young people). The situation was similar according to creative potential too: in the older age group, the difference between average values of social activity in groups with creative potential higher and lower than a median one reached 0.064 units, while it was slightly higher – 0.088 units – among young people (*Tab. 4*).

The result was expected when highest values of social activity index were achieved in groups with simultaneous fulfillment of two conditions: it was higher than a medium value of physical health index and other indices (mental health, cognitive and creative potential), which are related to social capacity. In same situations, when the first indicated condition was met, and the second one was not (indicated indices of social capacity were lower than a median one), social activity was lower than in the situation with a simultaneous fulfillment. The lowest values of social activity were reached, if values of the physical health index and other components of social capacity were lower than median ones.

[14] Polar groups are formed according to health status by summing two positions: in the first case – "excellent" and "good", in the second case – "bad" and "very bad".

Table 4. Average value of social activity index in each population group in the Vologda region

	Social activity index: average value (un.)											
	under 29			30–50			50 and older			in general for all ages		
	PH* below median	PH above median	ave-rage	PH below median	PH above median	ave-rage	PH below median	PH above median	ave-rage	PH below median	PH above median	ave-rage
Average among workers	0.680	0.743	0.722	0.674	0.735	0.703	0.639	0.683	0.650	0.664	0.732	0.696
Mental health												
below median	0.692	0.737	0.712	0.666	0.713	0.682	0.638	0.687	0.649	0.661	0.714	0.678
above median	0.663	0.745	0.728	0.686	0.747	0.722	0.640	0.680	0.651	0.669	0.741	0.712
Cognitive potential												
below median	0.615	0.688	0.663	0.634	0.702	0.660	0.608	0.612	0.608	0.624	0.689	0.650
above median	0.756	0.800	0.786	0.735	0.760	0.749	0.686	0.730	0.700	0.724	0.768	0.747
Creative potential												
below median	0.613	0.707	0.677	0.638	0.703	0.664	0.620	0.620	0.620	0.630	0.695	0.657
above median	0.738	0.779	0.765	0.719	0.758	0.740	0.663	0.739	0.684	0.706	0.762	0.734

* PH – physical health index.
Source: data of monitoring of the quality of labor potential of the Vologda Oblast's population, FSBIS VoIRC RAS, 2018.

Another interesting feature, identified during the analysis, was that, in all selected age groups, values of social activity index were higher when indicators of cognitive and creative potentials exceeded the median level, and indicators of physical health, on the contrary, did not reach it. At the same time, in the opposite situation, values of social activity index were lower. It may indicate the important role of cognitive and creative aspects in achieving a high level of social activity.

The last objective of the study was to analyze the impact of health status on individual characteristics of using accumulated potential (including productivity and labor remuneration). It was revealed that, regardless of the health status, within studied age groups, the highest values of average labor productivity were observed among older population. Average monthly wages of respondents in the older age group with excellent and good health is comparable to wages of middle-aged population with similar health status (26.9 and 27.0 thousand rubles). Wages of older population with satisfactory health status is proportional to wages of young people with similar health conditions (*Tab. 5*).

The implementation of potential largely depends on its accumulation, on the level of the formation of certain components of social capacity. In this study, we determined that older population with excellent and good health has

Table 5. Indicators of labor activity in groups of respondents with different self-assessment of health status in the Vologda Oblast

		Average in age	Assess, in general, your health status		
			Excellent; good	Satisfactory	Bad; very bad
Category's size, people.	under 29	241	170	66	4
	30–50	678	332	315	29
	50 and older	243	54	153	35
Average labor productivity, points					
under 29		8.0	8.3	7.5	7.0
30–50		8.2	8.5	7.9	6.6
50 and older		8.1	8.8	8.0	7.7

Continuation of Table 5

	Average in age	Assess, in general, your health status		
		Excellent; good	Satisfactory	Bad; very bad
Average monthly salary for previous 12 months, thousand rubles				
under 29	22.3	23.5	19.6	20.5
30–50	23.5	27.0	20.7	15.2
50 and older	21.1	26.9	19.4	19.4
Physical health, average value, un.				
under 29	0.794	0.850	0.674	0.431
30–50	0.737	0.827	0.664	0.506
50 and older	0.673	0.815	0.665	0.488
Mental health, average value, un.				
under 29	0.849	0.874	0.795	0.763
30–50	0.786	0.825	0.759	0.638
50 and older	0.749	0.765	0.750	0.718
Cognitive potential, average value, un.				
under 29	0.597	0.602	0.582	0.639
30–50	0.606	0.627	0.590	0.540
50 and older	0.595	0.643	0.586	0.566
Creative potential, average value, un.				
under 29	0.568	0.565	0.573	0.628
30–50	0.560	0.579	0.546	0.491
50 and older	0.552	0.566	0.552	0.536
Communication skills, average value, un.				
under 29	0.755	0.763	0.737	0.677
30–50	0.740	0.764	0.720	0.700
50 and older	0.739	0.708	0.754	0.715
Cultural level, average value, un.				
under 29	0.692	0.717	0.627	0.592
30–50	0.691	0.736	0.655	0.587
50 and older	0.663	0.697	0.656	0.642
Moral level, average value, un.				
under 29	0.769	0.792	0.712	0.698
30–50	0.769	0.798	0.747	0.676
50 and older	0.770	0.790	0.766	0.757
Need for achievements, average value, un.				
under 29	0.688	0.701	0.650	0.724
30–50	0.653	0.692	0.620	0.559
50 and older	0.563	0.603	0.562	0.503
Psychophysical potential, average value, un.				
under 29	0.818	0.859	0.728	0.567
30–50	0.757	0.822	0.706	0.565
50 and older	0.703	0.785	0.701	0.588
Intellectual potential, average value, un.				
under 29	0.579	0.580	0.574	0.631
30–50	0.578	0.598	0.564	0.513
50 and older	0.570	0.599	0.565	0.548
Communication potential, average value, un.				
under 29	0.716	0.733	0.674	0.628
30–50	0.709	0.743	0.681	0.636
50 and older	0.693	0.695	0.697	0.669

End of Table 5

	Average in age	Assess, in general, your health status		
		Excellent; good	Satisfactory	Bad; very bad
Social activity, average value, un.				
under 29	0.723	0.741	0.676	0.710
30–50	0.703	0.738	0.673	0.607
50 and older	0.650	0.681	0.648	0.609
Energy potential, average value, un.				
under 29	0.684	0.702	0.642	0.595
30–50	0.658	0.697	0.628	0.534
50 and older	0.629	0.681	0.626	0.563
Socio-psychological potential, average value, un.				
under 29	0.717	0.734	0.672	0.668
30–50	0.704	0.739	0.675	0.619
50 and older	0.669	0.685	0.670	0.636
Capacity, average value, un.				
under 29	0.698	0.716	0.655	0.627
30–50	0.679	0.716	0.649	0.573
50 and older	0.647	0.681	0.646	0.597

Note: integral quality of labor potential – social capacity – at the intermediate (second) level is generalized to four groups of basic qualities: psychophysiological, intellectual and communicative characteristics, social activity, at the third level – to two components (energy and socio-psychological potentials).
Source: data of monitoring of the quality of labor potential of the Vologda Oblast's population, FSBIS VoIRC RAS, 2018

the highest values of the index of cognitive and intellectual potentials in comparison with respondents of other age groups with similar health status. At the same time, the lowest values of indices were revealed for such components of social capacity as physical, mental health, and sociability.

While reviewing the older population group, members of which assess their health as satisfactory, it was revealed that the highest values of indices were achieved by cognitive potential, sociability, cultural and moral level, the lowest ones – by physical and mental health and the need for achievements.

The health status affects not only the potential, its implementation, and social activity but also concerns over job loss. In case of excellent and good health, regardless of an age group, such concerns did not appear in seven out of ten cases. However, for example, in the group with poor and very poor health, there were fewer people who experienced a similar condition (*Tab. 6*).

To sum up, based on data of monitoring of the quality of labor potential of the Vologda Oblast's population for 2018, we would like to state that older population, in general, had a satisfactory health status, which was manifested by the prevalence of minor ailments and diseases that lead to inability to work.

While summing up these results, we would like to note the following: the novelty of the research is the usage of the concept of population's qualitative characteristics, which is the basis of the index approach to its analysis – in particular, to the assessment of physical, mental health, and population's social activity. This approach is applicable to the analysis of qualitative characteristics of population and individual groups, such as older people. The usage of such approach allowed revealing that population belonging to the older age group had low values of need for achievements and social activity indices. Poor and very poor health among older population increased the negative effect, which was manifested by lower values

Table 6. Distribution of responds to the question "If you have any concerns over losing your job, what is the main reason of it?" in three age groups among respondents with different self-assessments of health status in the Vologda Oblast, % from the number of respondents

Reason of concerns	Under 29				30–50				50 and older			
	Average at age under 30	Excellent; good	Satisfactory	Bad; very bad	Average at age of 30-50	Excellent; good	Satisfactory	Bad; very bad	Average at age above 50	Excellent; good	Satisfactory	Bad; very bad
Category's size, people	241	170	66	4	678	332	315	29	243	54	153	35
Economic situation in a company where I work is unstable	12.4	11.2	15.2	25.0	10.5	8.4	12.7	10.3	9.9	11.1	11.1	2.9
Trade union plays a constantly decreasing role in regulating labor relations at an enterprise	3.3	4.1	1.5	0.0	3.2	3.3	3.2	3.4	4.9	5.6	5.9	0.0
Expiration of an agreement (contract)	2.9	2.9	3.0	0.0	2.5	2.1	2.9	3.4	2.5	1.9	2.6	2.9
Job is not my specialty	6.6	4.7	9.1	50.0	3.8	2.1	5.4	6.9	6.6	5.6	8.5	0.0
Qualification does not correspond to performed work	6.6	5.9	7.6	25.0	2.9	1.2	3.2	20.7	4.5	5.6	4.6	2.9
My health worsened	3.3	2.9	3.0	25.0	6.2	2.7	6.7	41.4	14.4	7.4	13.7	28.6
Bad relations with management, with a team	3.3	1.8	6.1	25.0	4.3	2.4	5.4	10.3	4.5	5.6	3.9	5.7
I heard that, in the near future, there will be layoffs at enterprises where my family members, or I, work	3.7	4.1	3.0	0.0	4.9	3.0	7.0	3.4	5.8	3.7	5.9	8.6
Other reasons	2.1	2.4	1.5	0.0	1.8	2.1	1.6	0.0	3.3	1.9	2.6	8.6
I have no concerns over losing a job	71.0	74.1	63.6	50.0	73.0	79.8	68.9	41.4	65.8	74.1	64.7	57.1
Source: data of monitoring of the quality of labor potential of the Vologda Oblast's population, FSBIS VoIRC RAS, 2018												

of social activity and need for achievement indices (as a component of social activity) in comparison with average values in this age group.

It was determined that the lowest values of social activity were reached in cases when two conditions were met simultaneously – physical health index and, for example, indices of cognitive and creative potentials were lower than median values. At the same time, the highest values of social activity were recorded in the opposite case – when studied indices were higher than median values. In intermediate situations, if values of some indices are lower than median ones, and others, on the contrary, are higher, it was revealed that social activity is higher in cases when indicators of cognitive and creative potentials exceeded the median level, and indicators of physical health, on the contrary, did not reach it. It indirectly characterizes the important role of cognitive and creative aspects in ensuring high social activity and a high level of labor potential [49, p. 62].

The article shows that older population plays an important role in the economic life of society [50, p. 14–15]. For example, older population with excellent and good health has the highest values of indices of cognitive and intellectual potentials in comparison with respondents from other age groups with similar health status. The lowest index values were revealed for physical, mental health, and sociability. If we overview the older population group with a satisfactory state of health, then low values of indices of physical and mental health are natural, while the highest values, on the contrary, were achieved in terms of cognitive

potential, sociability, and moral level. Thus, it may be noted that population of this age group has a fairly high cognitive and intellectual potentials as a competitive advantage. In such conditions, it is expected that average monthly wages of respondents in the older age group with a satisfactory state of health is proportional to wages of young people with a similar state of health. In the same case, when it comes to older respondents with excellent and good health, their wages are proportional to wages of middle-aged population. Therefore, if we speak about a "loss" in financial terms, it is insignificant in comparison with other studied groups. The "loss" in labor productivity was not recorded at all – it was the largest among all groups.

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Information Competences of Young People within Digitalization of Society

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Abstract. Young people are the object and subject of social relations. The relevance of the research is the need to study the readiness of young people for rapid, unpredictable, and often manipulative impacts of society digitalization. It is also necessary to identify the level and features of information competences of the youth's forefront – university students. They, by definition, due to their main activity – study, should share values of digital society and culture not just as ordinary consumers but as active and competent users. The scientific novelty of this work is the analysis of contradictory changes that occur under the influence of digitalization in all spheres of public life and a young person's personality. According to the results of the sociological study, conducted in 2014–2019, there was the contradiction between levels of information competences that are necessary and available for successful adaptation to life in digital society among Astrakhan, Volgograd, and Moscow's university students: most respondents possess the level of an ICT user, and only a small share of people has the competence of an ICT creator. Besides, the frequency of Internet logins for educational and professional activities decreases, and the number of Internet logins for leisure and pleasure increases. This trend may reflect dysfunctions of online education, which is an attribute of digital society, and destructive manifestations of Russian society digitalization. In addition, the current generation of young people is more like digital migrants who learn the language of the Internet as well as a migrant learn the language of a host country. Thus, they are unlikely to use the whole potential of ICT in their lives, their social capital is primarily formed of other sources.

Key words: youth, digitalization of society, information competences, students.

Introduction

Youth is not just an object but also a subject of public relations: the future of the country depends on them. It acts as the forefront of the innovation spread (electronic technologies, for example). Currently, Russian society is at a new stage of the society informatization – digitalization, when a young person deals not only with a certain information and communication technology but with an information and analysis (information and expert) system which is a set of interrelated technologies [1]. Ongoing technological changes and its impact on society and young people as a socio-demographic group are so rapid and unpredictable that the terminology itself appears very quickly. With it, researchers try to reflect on fundamental social transformations – "post-industrial society", "information society", "knowledge society", "informatization". Now, digital society, which is not yet comprehended by researchers, occurs in an everyday life of young people in a powerful, comprehensive way, changing it, quite often, by manipulative means (when a young person is not warned and has no idea about the consequences).

According to 2017 data of the European Commission, the most important indicator of digitalization (along with the connection of subscribers to the Internet (fixed broadband connection, mobile broadband connection, speed, and affordability), Internet usage (content, communication, and transactions), integration of digital technologies (business digitalization and e-commerce), and digital public services (e-government)) is human capital – primarily, digital competencies [2].

Researchers disagree about the content characteristics of "society digitalization", "digital society" concepts and its correlation with associated concepts – "post-industrial society" [3], "information society" [4], "network society" [5], "digital capitalism" [6], "peeping" capitalism" [7]. The term

"hybrid world" is also used. It is characterized by the fusion of virtual and real environments on the basis of digitization of the whole surrounding world including business processes, biomaterials of the surrounding world and a person, complete information about a person [8]. In this regard, the content of the "digital competence" concept is not clear too.

The logic of our thoughts on contradictory challenges of digitalization in various spheres of public life caused the choice of the term "information competences" for achieving the research purpose. We would like to note that there are different points of view toward relations between "digital competences" and "information competences" concepts. Thus, several researchers believe that the concept of "digital competences" includes the concept of "information competences": each of these concepts is associated with a certain stage of society development – information, digital [9]. There is also a research view according to which information competences are understood as broadly as possible – as activity skills in relation to information in educational subjects, areas, and the surrounding world [10, p. 45–46; 11, p. 52]. With such a broad understanding, it is necessary to clarify the key concept – "information". In common views, information could be understood as the entire flow of messages. However, according to the authoritative opinion of K.E. Shannon [12], information is a message that reduces a consumer's uncertainty. Similarly, N. Viner analyzes the amount of information in a system as a measure of its organization [13, p. 56]. A number of researchers define information as the main spiritual content [14] constituting the social system's structure [15, p. 63]. Thus, information competence is a universal characteristic of a person that provides an ability to determine the main content of the system, establish connections with various forms of a human life on the basis of creativity and goal setting. Digital skills are a component of information competencies.

The purpose of this article is to analyze the level and features of information competences of university students. To achieve this goal, several aims should be achieved:

1) to investigate the impact of digitalization on various aspects of public life as a range of challenges to the content of young people's information competencies;

2) to determine on the basis of the results of a specific sociological study:

– the level of information competencies of young people – the user level, ICT creator level;

– features of information competencies of this young people's generation, which are determined by the specifics of their activities in choosing information sources.

What are the contours of digital society in the most general approximation where a modern person will exist; what information competencies, knowledge, skills, and values a member of the younger generation should acquire now, during school studies, in a university or college in order not only to successfully adapt to surrounding social reality but also to creatively recreate and transform it. After all, the ability to create, transform, and develop is a manifestation of the essence of a Human-person, and not just a human as a biological being.

Without a doubt, digital society is a complex techno-social system [16, p. 42], where rapidly changing technologies largely determine activity modes, behavior, ways of thinking, and even frameworks (boundaries) of a real/virtual, material/ideal, human corporeality and consciousness. Researchers note that "digitalization is a transformation, and technologies are its tools. It is important to note that these transformations depend on a large-scale technology adoption. Some of these technologies already exist, and it is used

in different ways: mobile Internet, Internet of things (IoT), and artificial intelligence (Al). Other technologies exist, but it has not yet been adopted in scales necessary for providing any meaningful impact on our way of living: three-dimensional (3D) printing and next-generation genomics [17]. The list of these technologies is being updated, but the essence of digital society, as a new development stage of information society, is that "activities are implemented through the digital representation of objects. Procedures for converting objects of various nature into a digital form (a digital model) and vice versa became possible due to achievements in the field of digital information technology, and it may be used, or it is already used, in almost any field of human activity". Using the creation of a digital model of a material or non-material object, a new material or non-material object [18, p. 198], a new techno-digital form of existence [19, p. 178], which transform all spheres of public life and a person, are created.

For example, characteristics of economic relations change. In particular, the mechanism of market value formation, market business models are integrated into a virtual (digital) sector; a number of intermediaries significantly reduces; the importance of an individual approach to product formation increases; there is a separation of "analog" and "virtual-digital" economies; fifth-generation communication networks emerge. "Duplication of a "similarity" of business niches in the Internet generates high competition, and it causes the formation of an economy of ultra-high images and ultra-high rating levels. There are peer-to-peer interaction models (client-client) that are implemented using digital platform services (Uber, BlaBlaCar, BelkaCar, Airbnb, etc.); an economy based on the Win-Win model (both sides win): on the one hand, owners of assets who can lease it for a fee, and, on the other hand, consumers of assets who lease an asset for solving a specific task in the short-term period". There is a transformation of management – from a centralized one to decentralized; the function of money changes: when a contract and money are one and the same, it may lead to crypto-socialism. "In this type of society, economic relations are digitized; in relations of entities, everything is aimed at reducing the Commission costs" [8, p. 591–592].

It is assumed that principles of human management will also change, and institutional and regulatory spheres will transform. Expert systems "will soon allow creating an environment of a high-tech digital platform of state administration, which will ensure the minimization of the human factor and accompanying corruption and errors, automate the collection of statistical, tax, and other reports, and ensure decision-making based on the analysis of a real situation" [20, p. 280].

A number of researchers review digitalization processes in the economy in a positive, even rosy-positive, way; they highlight the openness, transparency of digital communications in the economy, its role in the creation of a qualitatively new socio-cultural environment, social lifts, the erasure of geographical borders, which will allow residents of remote settlements to receive good education, improve their skills and find a job [21–27]. N.M. Abdikeev notes that "cognitive and creative human component of technological processes and intellectualization of production become defining development factors. The core of the new economic system, which is developed on the basis of information technologies, is an intellectual activity, which ceases to be an application and appendage of the machine production of material goods" [28, p. 25–26]. According to T.N. Judina, there was no cohesive understanding of the digital economy, which has been developing in Russia for three years. She highlights that the digital economy is a forming system and, possibly, an *antisystem* of "productive and/or

economic relations which may function *without a direct human involvement* "in the production sphere as Industry 4.0 (cyber-systems together with the "Internet of everything"), virtual distribution, exchange through digital platforms, and individualized consumption" [29, p. 7] *(authors' italics)*. Judina's opinion that the digital economy may become an antisystem existing without a man is somewhat confirmed by the existence of a phenomenon in a modern labor market that show (in K. Marx's terminology) the scale of a labor alienation – the productivity paradox. Digital technologies become a factor-provocateur which, although increasing labor productivity, slows its growth rate – it could be seen in the last decades [30].

The humanity of digitalization's consequences in the socio-economic sphere of society, in particular, for providing employment, is not completely clear. On the one hand, the introduction of digital technologies into production leads to the creation of new jobs (for example, in the United States, one job in the ICT industry provides almost five new jobs in other industries). However, on the other hand, "more than 80% of developed countries' population and only about 30% of developing countries' residents had access to the global web in 2015. An important remaining risk is that, in the process of so-called natural economic selection (for example, in a race for a consumer), many players of the digital technology market resort to a policy of dumping prices, thus, increasing the consumer basis, i.e. the risk of monopolization in a particular industry and the risk of concentration emerge. It is interesting to note that, with the introduction of digital technologies, the importance of highly qualified personnel grows (enterprises try to increase their number among the staff) along with the share of low-skilled employees. Digital technologies that substituted standard, routine work duties forced low-skilled personnel to leave their workplaces or move to a less skilled (less paid) jobs. At the same time, the share of the main part of the working class (the middle population class) declines, and there is a global increase of income inequality" [31, p. 5–6]. There is a forecast that, in the next ten years, a number of job places will decrease by 6.7 million in Russia alone [32, p. 32].

Prospects of digitalization's impact on the cultural sphere are even more obscure. The technical potential of modern media allows introducing new attitudes into the mass consciousness which are related to technologies for manipulating a human body and behavior. After all, these technologies are so revolutionary that they should provoke questions and answers about boundaries of what is allowed in this area and what is not. A system of values should be formed, a new culture that makes a human a Person should emerge. However, if this culture is formed on the basis of attitudes of consumer society, then a fundamental question becomes relevant: what are true values that are a foundation of true human existence, and how to separate it from pseudo-values which may make a human life become a part of the market of biomaterials.

Indeed, a new form of culture is being formed – electronic, digital. It still bears features of a protoculture which becomes a cultural system, a social institution [33–35]. A cartography of a personal and social life within this type of culture is not yet clear, and no models of identity identification have been proposed [36]. Therefore, researchers suggest that, currently, public systems represent special socio-technological landscapes, where modern trends of digitalization coexist with generally accepted cultural values [37, 38]. In our opinion, in this situation, it is possible to actualize traditional forms of culture even among young people, who are influenced by digitalization and its ideology in a most significant way.

What are the requirements of digitalization for a young person's personality, what social qualities should he/she receive and learn for socialization at the stage of the transition from youth to adulthood and maturity to be considered successful? According to S.A. Dyatlov, it requires high qualification, mobility, creativity, and significant intellectual capital of an employee who becomes "the main factor of high dynamism of global information economy and success within global information hyper-competition, contributes to decline of knowledge, communication, and economic entropy" [39, p. 17]. Such employee possesses an important competence – the competence of assessing time as the main non-renewable resource of the high-speed economy [40, p. 47]. According to N.V. Zubenko and D.V. Lanskaya, successful socialization of a young person consists of overcoming the main risk of today – digital backwardness. It could be done on the basis of a qualitatively new education which, as a part of spiritual production, comes to the fore outpacing material production in terms of importance and significance. Spiritual production is designed to balance high psychological, technogenic, informational, and anthropogenic risks, threats, costsб and dangers of the technological revolution associated with the sixth and seventh technological orders [41, p. 145–146]. These risks are very high: it includes the reduction of authentic interpersonal communication, the formation of a hybrid identity, a "digital identity"; the saturation of the information space with simulacra; real time total control over human movements and activities; legal risks, in particular, the usage of personal data for fraudulent and illegal purposes; digital inequality; the alienating influence of various models of so-called efficient management, aggravated by smart "digitalization" [42–48]. T.F. Kuznetsova also predicts significant changes in the humanitarian sphere of public life, and she emphasizes the crucial role of humanitarization of "all levels and forms of the educational process. It would be wrong to weaken the digital component of this process, since microsystem competition moves from the economic sphere to the cultural one, and digital education does not provide national security in this segment. Humanitarization is a technocratic attitude counterforce to the education system, and it makes it possible, without losing the orientation of the system toward the future, not to abandon Russia's achievements in education" [49, p. 34].

Let us turn to the study of information competencies of students in Russian universities. The choice of university students as the target audience of the research is not accidental. University students are the forefront of youth, the future managerial elite of the country. For students, study is a priority activity aimed at introducing them to values of, in general, society, culture, and, in particular, emerging digital society [50]. At the same time, it is implied that students should not just study digital technologies as ordinary consumers, but they should also be able to develop it in the future as active and competent users.

Methodology of the research

Under the leadership of S.V. Kargapolov, a sociological survey "Electronic culture of university students" was implemented among students of higher education institutions in Astrakhan, Volgograd, and Moscow (the first stage – May, 2014, N = 750 people; the second stage – October–November, 2018 (N = 1.128 people). In March 2019, Moscow university students were also interviewed (N=1.240 people). The study had a probing nature, the task of sample representing was not set, the obtained results may only apply to the sample set or used as a reference. However, the number

of respondents allows making assumptions and formulating hypotheses. Data processing and analysis were performed using SPSS 17.0. Considering the difference of the study timing in the metropolitan area and cities of the Nizhne-Volzhskiy region, the comparison of the results may only be conditional, but inter-regional comparisons clearly show the influence on digitization processes of the specific local-territorial environment, among which, for example, the territorial conditions for choosing a university, the state of the regional education system, the specifics of the mentality, the living world of the population of the region [51]. To reach a set goal, we analyzed student responses to questions indicating the level and features of their information competencies: "From what sources do You mostly get the information You are interested in?", "After getting into a difficult situation, You usually turn first to ...", "Is it easy for You to understand the interface of a program, website, or device?", "At what age did You first used the Internet?", "At what age did You first use social networks?", and questions about the frequency and aims of usage, creation of different electronic resources.

Results of the research

As we have mentioned earlier, information determines the main thing in the system's spiritual content. At the same time, an information source (channel, means) has a significant impact on the specifics of the system functioning, in our case – people's consciousness, thinking, and, accordingly, ability to process, transmit, and store information [52–54]. Thus, information competences of a person are implemented in the selection of information sources. Specifics of information competencies of a young person in electronic, digital society are showed by the results of responses to the question "From what sources do You mostly get the information You are interested in?", which involved a multiple (up to three options) choice (*Tab. 1*). Thus, the Internet as a source of information was chosen by most respondents, and the share of those who select this option increases. However, interestingly, with the priority of the Internet, the share of people who chose a book as a source of information also increased. In Moscow, which is a megalopolis where all innovations (in our case, electronic technologies) should spread faster, the share of appeals to a book, even in 2019, is not less than in cities situated in the South of Russia. In our opinion, it shows the actualization of traditional forms of culture within the formation of electronic culture among students.

Thus, the assumption that new mass media play not just a priority but a dominant role in the socialization of the younger generation is not confirmed. When faced with a difficult situation, about 60% of students in Astrakhan and Volgograd turn to their parents and relatives, every fifth student – to friends, and only every tenth student – to Internet search

Table 1. Students' responds to the question "From what sources do You mostly get the information You are interested in?", (% of respondents)

Option	Astrakhan		Volgograd		Moscow
	2014	2018	2014	2018	*2019*
Television	44.9	37.1 ↓	35.6	33.5	*23.6*
Internet	90.6	95.4	95.4	98.0	*95.4*
Relatives, friends, colleagues	37.1	53.2 ↑	46.9	61.4 ↑	*50.6*
Press (Newspapers, magazines)	10.6	8.0	10.6	5.1	*6.8*
Radio	9.4	5.8	8.4	5.3	*4.5*
Books	24.1	29.4 ↑	27.4	32.2 ↑	*28.8*
Professional and popular science magazines	5.7	6.6	7.7	7.1	*9.3*

Table 2. Students' responds to the question "After getting into a difficult situation, You usually turn first to ..." (% of respondents)

Option	Astrakhan 2018	Volgograd 2018	*Moscow 2019*
Parents	54.8	56.3	*35.8*
Relatives	8.0	6.2	*6.9*
Friends	20.2	18.0	*32.7*
Internet search system	10.6	8.9	*14.5*
Social networks	0.4	0.2	*2.1*
Hesitate to answer	5.2	7.5	*6.1*
Refuse to answer	0.7	2.0	*1.9*

systems *(Tab. 2)*. In other words, the preference is given to an interpersonal social circle rather than electronic communications. In addition, the share of requests to relatives, friends, and colleagues as sources of information has significantly increased. We may conclude that the choice of a specific source of information is situationally determined. Even among Moscow students, the share of appeals to relatives is high. Although, often, there is not enough time for live communication in a metropolis. This is probably the reason why only 42.7% of Moscow students turn to their parents and relatives in a difficult situation, but many more of them turn to friends, and 14.5% turn to Internet search systems for answers to difficult questions, which is close to the 15% socially significant defining point. It should also be noted that the share of those who chose TV as a source of information has significantly decreased among Astrakhan students, and now it is close to the share of students who did the same in Volgograd. Among Moscow university students, the share of those who prefer television is much less.

In the second wave of the study, respondents were asked a question concerning information competences of students: "Is it easy for You to understand the interface of a program, website, or device?". The option "easy" was chosen by 60% of respondents, the option "easy, with instructions" was selected by, approximately, every fourth, fifth respondent, the option "problematic, ask for help" was chosen by, approximately, every tenth respondent. A statistically insignificant percentage of respondents – less than 3% – cannot understand the interface on their own *(Tab. 3)*. It should be noted that the level of digital literacy, demonstrated by students in different towns, does not differ significantly. Although, it could be assumed that students from Moscow – a megapolis – who were also interviewed six months later than Astrakhan and Volgograd's students, would show a higher level of digital literacy. Moreover, the average age of Moscow students during their first access to the Internet was 10.2 years, Volgograd students – 10.7 years, Astrakhan students – 11.5 years. In

Table 3. Students' responds to the question "Is it easy for You to understand the interface of a program, website, or device?" (% of respondents)

Option	Astrakhan 2018	Volgograd 2018	*Moscow 2019*
Easy	58.2	57.2	*59.5*
Easy, with instructions	27.6	26.8	*27.1*
Problematic, ask for help	9.9	9.1	*8.9*
I cannot figure it out by myself	0.9	1.3	*1.6*
Hesitate to answer	2.2	3.1	*2.8*
Refuse to answer	1.2	1.3	*0*

our case, the smaller the population of a town and the further it is located from Moscow, the higher the age of the first Internet access. The same trend was observed while analyzing the average age of the first social network connection: in Moscow, it was 11.6 years, in Volgograd – 11.9 years, in Astrakhan – 12.8 years.

Digital literacy has become an integral part of information competencies. For example, the share of students who, for the last year, has been using the Internet and a mobile phone once a day and more often approaches 100% *(Tab. 4)*. Among Astrakhan residents, there is a significant increase of social networks usage, and, in general, the frequency of accessing social networks is comparable to the frequency of using the Internet and mobile phone. The share of Astrakhan residents who use messengers once a day and more often for communication sessions increased from 11.8% to 60%. It is similar to the same indicator among Moscow students. Interestingly, among Volgograd residents (there is a vast number of "techies", who are enrolled in technical education, among population), the growth was also significant, but, in 2018, it was lower than among Astrakhan and Moscow students.

The share of computer users significantly decreased: it was replaced by gadgets. However, there are many questions on whether a gadget can fully replace a computer for performing all educational and professional tasks, especially among students enrolled in technical education. It should be noted that the lowest percentage of students who use a computer once a day and more often is registered among Moscow students. The frequency of using e-government portals changed slightly: only one out of three students visits these websites once a month. 11.5% of Astrakhan residents, 9.3% of Volgograd residents, and 6.6% of Moscow students have never used e-government portals.

The ability to use electronic technologies is an evidence of a minimal and insufficient level of information competences within digitalization. The norm for a digital society is the level that allows a user to create electronic programs himself, if necessary. According to researchers, the level of an electronic programs creator, programming skills in assembly languages and languages of "high level are required not only for narrow specialists, because they contribute to the formation of managerial skills, if the task of such formation is to be solved seriously" [55, p. 55]. This is required for bringing information competencies in line with trends of the digital economy. "Projected professions of the future show an increasing role and expansion of boundaries of programming application" [56, p. 986]. The founder of the Davos Forum, Klaus Schwab, called programming the second literacy [57]. Knowledge of programming algorithms in the digital age may be compared to knowledge of the alphabet. Like, for example, alphabetic and hieroglyphic writing forms a

Table 4. Students' responds to the question "How often did you use it in the last year?"
(% of respondents who chose the answer "once a day and more often")

Option	Astrakhan		Volgograd		*Moscow*
	2014	2018	2014	2018	*2019*
Computer	86.1	61.7 ↓	91.4	67.6 ↓	*52.8*
Internet	91.8	95.1	96.0	94.5	*94.0*
Mobile phone/ smartphone	93.9	96.3	94.9	95.6	*94.6*
Social networks	74.7	91.9 ↑	90.5	89.8	*92.2*
E-government portals (public services, GIBDD, etc.)	3.7	6.8	3.8	3.5	*7.7*
Communication sessions using the Internet (Skype, WhatsApp, and other messengers)	11.8	60.0↑	20.8	40.1↑	*59.1*

Table 5. Students' responds to the question "How often did you in the last year...?" (% of respondents)

Option		Created electronic programs			Created websites	Processed videos or photos
		in educational activities	in professional activity	to make everyday life easier		
Once a day and more often	Astrakhan	7.8	7.2	14.0	3.1	16.5
	Volgograd	6.4	6.2	15.7	1.1	9.5
	Moscow	*10.2*	*7.8*	*7.9*	*6.4*	*18.5*
Two or three times per week	Astrakhan	12.1	8.4	7.7	1.9	19.9
	Volgograd	14.2	9.8	9.8	1.1	16.4
	Moscow	*13.0*	*8.6*	*7.8*	*6.2*	*26.5*
Once a week	Astrakhan	10.3	6.1	6.1	1.6	16.5
	Volgograd	23.3	11.8	8.9	1.6	17.3
	Moscow	*12.9*	*8.3*	*7.7*	*6.1*	*18.2*
Once a month	Astrakhan	10.6	6.4	6.9	4.6	19.6
	Volgograd	11.1	8.0	8.4	4	22.4
	Moscow	*12.1*	*7.2*	*9.1*	*5.6*	*20.2*
Once in six months	Astrakhan	8.4	6.2	4.6	6.5	10.8
	Volgograd	8.9	5.3	6.2	7.5	14.6
	Moscow	*10.4*	*8.8*	*8*	*15.1*	*7.9*
Less than once a year	Astrakhan	6.8	6.2	5.8	14.8	7.2
	Volgograd	6.4	4.2	5.8	18.8	6.9
	Moscow	*0*	*0*	*0*	*0*	*0*
Never	Astrakhan	35.2	48.6	44.3	59.4	7.1
	Volgograd	21.1	40.4	32.8	58.5	10.2
	Moscow	*28.8*	*44.2*	*43.5*	*45.1*	*5.7*
Hesitate to answer	Astrakhan	6.9	9.3	8.7	6.6	1.8
	Volgograd	8.4	14	12.2	7.3	2.4
	Moscow	*12.7*	*15.1*	*16*	*15.5*	*2.9*

special style of people's thinking, programming languages also determine the appearance of a special computational, algorithmic thinking with its inherent skills of solving creative problems, critical analysis, and systematization [58–59]. Even "younger schoolchildren learning programming have an increased vocabulary, their speech becomes richer and more emotional", creative abilities develop [60, p. 144].

During the second wave of the research, students were asked the question "How often did You create electronic programs in the last year?". The level of students' information competence is showed by the fact that, when answering this question, there was the largest share of those who chose the option "never" *(Tab. 5)*. Thus, 21.1% of Volgograd residents, 28.8% of Moscow students, 35.2% of Astrakhan students have never created electronic programs in their educational activities; 40.4%, 44.2%, and 48.6% have never done it in professional activities; 32.8%, 43.5%, and 44.3% have never done it in their everyday lives, respectively. 45.1% of Moscow students, 58.5% of Volgograd university students, and 59.4% of Astrakhan students have never created a website. A significant share (from 6.6 to 16% in various answers) or respondents found it difficult to answer these specific questions, even though it seems quite simple – you created it, or you did not. Judging by these results, Volgograd residents (there are more "techies" among them) more often create electronic programs, and students of Moscow universities – websites. However, even among techies, there is a significant proportion of those who have never done it in their lives, which raises questions about the compliance of universities' educational programs, material, and technical equipment to digitalization requirements. In general, according to the array of respondents, information competences of ICT creators are formed during certain activities only, approximately, in every third case. At the same time, 16.5% of Astrakhan students, 9.5% of Volgograd students, and 18.5% of Moscow students process photos or videos every day.

Certain conclusions on students' information competences may be drawn on the basis of the analysis of students' responses to the question "For what purposes and how often do You use the Internet?" (Tab. 6). The most selected option is "for communication": the share of this respond's selections noticeably increased among Astrakhan residents, and it even exceeded the number of selections of this respond by Volgograd residents. Moreover, the share of choosing the option "for leisure" significantly increased among Astrakhan residents (this share, as in the first case, is equal to the share of this option's selections by Moscow students), while, among Volgograd residents, this share remained unchanged. The same trend is observed in the share of selections of the answer option "for fun": in Astrakhan, it increased and, in 2018, it was equal to the share of Moscow students' selection in 2019. In Volgograd, it increased slower, and it was inferior to the results received among Astrakhan and Moscow students.

Interesting results were obtained while analyzing the selection of the option "for information": most often, this option was chosen by Moscow students; in Volgograd, the share of this option's selections decreased (although it was comparable to Moscow data in 2014), and, in Astrakhan, it remained unchanged. According to A. I. Voronov, when an overabundance of information (messages) occur, there is a desensitization of existence through a mosaic of information schemes-narratives. "The result may be the emergence of a class of adherents of information and gaming culture, the main leitmotif of which will be the idea of enjoying information" [61]. Thus, the researcher believes that a modern man was barely ready for the usage of electronic

Table 6. Students' responds to the question "For what purposes and how often do you use the Internet?" (% of respondents who chose the option "once a day and more often")

Option	Astrakhan		Volgograd		*Moscow*
	2014	2018	2014	2018	*2019*
For work	57.1	35.9 ↓	40.9	33.8 ↓	*45.6*
For studies preparation	69.8	60.3 ↓	79.0	71.4 ↓	*63.7*
For information	74.3	75.0	82.1	76.9	*84.3*
For professional development	34.3	26.3	26.8	25.3	*36.6*
For leisure	64.1	80.1 ↑	76.3	76.1	*80.5*
For communication	67.8	91.0 ↑	80.5	85.8 ↑	*89.8*
For electronic payments and purchases	6.1	24.8 ↑	8.6	20.2 ↑	*33.5*
For creativity (creating works of science, literature, and art)	14.7	15.5	11.9	14.9	*23.2*
For pleasure	51.4	75.5 ↑	60.4	69.6 ↑	*74.3*
For scientific purposes	11.0	17.9 ↑	20.1	16.9 ↓	*26.3*
For money investment	2.9	10.0 ↑	4.2	9.3 ↑	*15.4*
For expressing my opinion	н/д	16.7	н/д	13.3	*23.2*

information technologies, which offered "old as the world method of imitating the truth". He assumes that, in the near future and in the worst-case scenario, the formation of a new human Homo-medium will happen. It will be characterized by a depleted nervous system and internal impersonality, as well as a complete inability to put filters for incoming information [61].

According to O.M. Zotova and V.V. Zotov, overabundance of information leads to information overload which correlates among students "with symptoms of stress; it is especially indicated by the emotional and physiological component of stress. However, if an organism of a student still copes with the consequences of information overload physiologically, then, emotionally, there is an indication of stressful phenomena" [62, p. 108]. It should be emphasized that the problem of information stress has not yet been solved radically [63, p. 133]. Moreover, the term "information tsunami" becomes a metaphor that defines the new digital world [64, p. 16].

The decline of the frequency of the Internet usage for studies preparation in Astrakhan and Volgograd also requires further careful analysis. It should be noted that, in 2014, the share of selections of this respond option in Volgograd was almost 10% higher than in Astrakhan. In 2018, Volgograd residents used the Internet to prepare for studies more often than Astrakhan residents did. It could be assumed that, in Moscow, where the best Russian universities and Russian students are centered, the share of selections of this respond option will be higher than in regional universities. However (this is one of the most surprising results of the survey), it just barely exceeded Astrakhan's results, and it was lower than Volgograd's results. It is extremely important for the analysis because it contradicts the logic of digitalization and the positioning of universities as centers of digital competences spread.

In Astrakhan and Volgograd, the frequency of Internet usage for work also decreases (most noticeably, in Astrakhan). According to the results of the second wave of the research, the share of students who chose this option, as well as the share of those who responded with the option "for professional development", is the highest in Moscow universities. It is interesting to note that, even in Moscow, only a little more than one third of respondents access the Internet once a day, or more often, for these purposes, while in Volgograd and Astrakhan –

every fourth person. However, in Astrakhan, this figure has significantly decreased since 2014, while it has remained unchanged in Volgograd. The question arises: what does a student understand by professional development, why does he / she not identify this process with studying at a university, getting a higher education that has ceased to be officially called professional?

We can also note that the share of Internet requests for electronic payments and purchases increased: in Astrakhan and Volgograd, one person out of four do it once a day and more often, and, in Moscow – one out of three. Students of higher education institutions in Moscow often go online to implement their creative potential – to create works of science, literature, and art. Among Astrakhan residents, the frequency of Internet access for scientific purposes increased, but the selection of this respond option is more common among Moscow students. They are also much more likely to use the Internet to express their opinion than people from towns of the Nizhne-Volzhskiy region. In addition, Moscow students are more likely to use the Internet to invest money, although the share of this option selection significantly increased in Astrakhan and Volgograd.

Conclusions

Thus, the contradictory impact of digitalization on various aspects of public life is shown. Challenges to the content of information competencies of young people in digital society are the need to form computational thinking with its inherent skills of creativity, critical analysis, algorithmization, programming. Successful capitalization of activities within digitalization requires the competence of an ICT creator. At the same time, a significant part of modern Russian young people, presented by its forefront – students, demonstrates a minimal level of digital literacy – the user level.

Features of information competences of this generation of young people are that, while choosing sources of information, most of them turn to the Internet, but the selection of the option meaning appeals to the primary social environment – parents, relatives, friends, and books (as carriers of meanings of traditional cultural forms) – is also actualized. Achieved results could be explained by the specifics of the studied "millennium" generation, which includes children who were born in the late 1990s–2002, and they are at the junction of two generations – Y and Z. On the one hand, researchers call these young people the "digital, post-television generation", since they are of the same age as the official delegation of their own domains to individual countries [65, p. 358; 66, p.5]. On the other hand, the uniqueness of this generation of young people is that their primary socialization was conducted under the priority influence of a family and under the secondary influence of new mass media. It is clearly evidenced by the age of the first Internet and social network usage. Using the terminology of M. Prensky, this generation may be called digital migrants [67], who master the Internet language in the same way as migrants learn the language of a host country. They are unlikely to be able to fully use the ICT potential during their lives, their social capital is largely formed from other sources [67, 68].

Undoubtedly, features of socialization of studied generation explain a lot. However, the trend of the decrease of Internet logins for educational and professional activities with the increase of Internet logins for leisure and pleasure activities requires further careful study. After all, this trend may indicate dysfunctions of online education, which is an attribute of digital society [69, 70], and destructive manifestations of digitalization of Russian society.

It is possible to conclude that there is a significant discrepancy between challenges of digital society and information competencies

of a significant part of young people who demonstrate a minimum level of digital literacy – the level of a user, a consumer. It becomes clear that, in such situation, it is more necessary than ever to develop computational (algorithmic) thinking based on self-organization and self-education. One of priority areas is also the formation of electronic culture, which is an instrument of active involvement of a person in the process of digitalization based on a value-reflective attitude to ICT.

Thus, the practical significance of the research includes the analysis of information competencies of the forefront of youth – university students – on the basis of the study of digitalization's contradictory challenges. The results may be used to predict the process of digitalization of modern Russian society. In addition, it is possible to use the results in the development of programs for advancing information competencies, forming electronic culture of students in the process of university studies. However, the substantive development of methodological recommendations for the development of such programs is a different task which requires, first, the attraction of the potential of the administrative management apparatus.

Prospects of our further research are related to the analysis of information competencies of children, pre-youth, and adults in order to show the specifics of working with information in these age groups, to fix differences between digital migrants and digital natives using empirical methods. At the same time, the answer to the question concerning the scope of electronic technologies' impact on goals, interests, and value orientations of modern young people remains open. In this case, technology may be called an external and often negative factor occurring in young people's lives and activities. In another case, technologies will acquire the nature of an attribute, a social quality of modern youth, and information competences will give it opportunities for creative transformation of a life.

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Risk Assessment of Urban Sectors to Climate Change in Istanbul

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Abstract. The aim of the present study is to investigate the risk of climate change on Istanbul. Istanbul is the largest city, in terms of both population and economic activity capacity, in Turkey meaning that any climate-related risk would be destructive not only for the city but also for the country. The urban system has been identified based on urban sectors that are the issues of activities, management areas, ecological systems, resources and species and critical for economic viability and public health of the city, also likely to be affected by climate-related disasters. 11 urban sectors and 25 sub-sectors, which are also presented as planning areas, have been determined considering the development strategies of Istanbul as water resources, health, energy, agriculture, transportation, development and land use, public safety, infrastructure, biodiversity and ecology, culture and materials. ICLEI's handbook titled "Preparing for Climate Change: A Guidebook for Local, Regional and State Governments" guided the risk assessment of these planning areas and sectors. The data has been obtained via in-depth interviews with city stakeholders and the sectors have been ranked considering the risk factors of each. The results of this study

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reveal the urban sectors that are under the greatest and lowest risk due to the impacts of climate change. Highlighting the climate change risk on vital sectors of Istanbul is essential for decision makers to develop further strategies to mitigate the impacts of climate change and adapt the upcoming impacts.

Key words: climate change, risk assessment, urban resilience, Istanbul.

1. Introduction

Non-natural climate change due to human activities has become the major global problem over the last few decades[1]. Climate change has directly impacted on ecosystems, physical systems and related human actions [1], and projections reveal that these impacts will be more severe in the future. Inevitably city systems, including settlements, infrastructure, and resources will be impacted by climate change [2; 3]. The level of preparedness of urban regions to climate change's adverse effects is critical in retaining viability and protecting inhabitants, and the first step in being prepared is to understand the risks of climate change for cities. Decisions made without an understanding of the risks and vulnerabilities would be meaningless so for, risk assessment is an essential part of resilience.

Turkey, has only recently started to discuss the negative impacts of climate change on the country and required adaptation and mitigation strategies [4]. Global concern about changing climate and the efforts of NGOs has led to increased awareness, however, Turkey still has a long way to go to achieve climate change resilience. Turkey needs both national and local strategies[2] in order to build more resilient structures.

In Turkey, resilience development is a fairly new topic whose pathway has not been discussed or determined yet. Therefore, the motivation of this study is to guide this pathway towards a more resilient model. Istanbul, as the largest metropolitan city in Turkey, should be the frontrunner in developing a resilient system guided by clear knowledge of the risks of the city.

The aim of the present study is to assess the risk of climate change on Istanbul's urban system. For this reason, 11 urban sectors (water resources, health, energy, agriculture, transportation, development and land use, public safety, infrastructure, biodiversity and ecology, culture and materials) and 25 subsectors (planning areas) have been determined to analyze regarding the ISTKA Regional Plan[3], which addresses Istanbul's strategic sectoral development axes. In this study, a multi-dimensional methodology which combines data collection from literature and institutions, in-depth interviews and risk assessment index is conducted and as a result, the sectors are ranked regarding their index values. This study is a part of a more comprehensive resiliency development study that consists of 3 main parts: vulnerability assessment [5]; risk assessment; and prioritization assessment of Istanbul's sectors. This article encompasses the risk assessment component in its results and conclusions.

The next section draws the conceptual framework of climate change risk, risk factors, resilience and risk assessment. After reviewing the literature on risk, the third section presents

[1] *IPCC. Climate change 2001: synthesis report; a contribution of Working Groups I, II, and III to the third assessment report of the Intergovernmental Panel on Climate Change,* 2001. Cambridge: Cambridge University Press.

[2] Metropolitan cities with high populations are a critical part of those strategies.

[3] *ISTKA* (İstanbul Kalkınma Ajansı). 2010–2013 İstanbul Bölge Planı, Istanbul. 2010

the case study, first explaining the sectors, data and methodology of the study, then evaluating the risk for each sector and planning area, finally, concluding by ranking the risk levels of all sectors. The last section is the conclusion and offers a roadmap for further research and plans. In this study, all sectors are considered with a comprehensive and multidimensional perspective in order to make a conclusion that compares and includes all systems; however, each sector can be analyzed in more detail in future studies.

2. Risk and climate change: conceptual framework

Risk is *"the chance of injury or loss as defined as a measure of the probability (likelihood) and severity of an adverse effect to health, property, environment or other things of value"*[4]. According to ISO 31010, the general definition of risk is the accumulation of the "consequences of a hazard and the probability of its occurrence"[5]. United Nations International Strategy for Disaster Reduction (UNISDR)[6] defines disaster risk as *"the potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period"*. All these definitions refer to disaster risks from both climatic and non-climatic hazards [6]. The definitions focus on *'the probability'* of a disaster's occurrence and *'the consequences'* of the hazard. Climate risk has the same basic definition; however, it includes climatic hazards such as landslides, droughts, floods, sea level rise, fires, windstorms, heat waves amongst others, only[7]. The severity of consequences are highly related to the vulnerability of the system and exposure [7].

The changing climate and the spatial distribution of the climate risks have been an important research area [8] especially for urban development discourse. Scientists stress that climate change particularly threatens metropolitan areas and cities[8] [9; 10] and metropolitan cities are the focal locus of climate- related risks due to their demographic structures, high population densities, and the concentration of cultural and economic services. Natural risks that pose a threat particularly to urban infrastructure will be more intense [10]. Climate change risk can thus be explained as the interrelation of governance and natural hazards. Decisions concerning land use and urban development affect the level of risk when a natural disaster occurs. The socio-economic impacts depend on governance strategies in risk areas [7].

2.1. Risk factors of climate change in cities

Cities are complex systems with various interconnected services, which leads to difficulties with disaster risk issues. The factors that determine the level of risk in cities are urban development, governance, infrastructure, human activities, and coordination among institutions. Rapid urban population growth and increasing density create pressure on land and services. Urban sprawl and high demand for urban development may cause extension of settlements to the urban risk areas. In terms

[4] Disaster Resilient Communities Initiative. Hazard, Risk and Vulnerability Analysis Tool Kit. Ministry of Public Safety and Solicitor General Provincial Emergency Program, 2004. British Columbia, p. 22.

[5] *European Commission. Commission Staff Working Paper: Risk assessment and mapping guidelines for disaster management,* 2010, p. 10.

[6] *UNISDR (International Strategy for Disaster Reduction).* Terminology: Disaster Risk Reduction. 2009. United Nations, Geneva, p. 25.

[7] *IPCC. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* 2007. Cambridge University Press, Cambridge, UK, and New York, NY, USA.

[8] EEA (European Environment Agency). The European environment – State and outlook 2010 (SOER 2010). Understanding climate change. 2010. Copenhagen: European Environment Agency

of governance, the central concentration of resources and capacities and the uncertainties of disaster response measures at the local level weaken local government and prevent more effective action. The weakness of local government and lack of local stakeholders' participation in planning and decision-making may mislead decision-makers about local risks. Inadequate urban infrastructure systems such as sewage systems, drainage systems, solid-waste management and water-resource management, may cause disasters and health problems. Loss of natural resources and ecosystems because of human activities such as pollution and urban sprawl decreases the potential of beneficial services from nature. The lack of coordinated emergency services to prepare for, or respond to, natural disasters may cause more damage to the system and citizens[9].

Climate change can have various direct impacts on cities such as heat waves, seal level rise, extreme weather events[10], but indirect impacts such as health problems and damage to resources, buildings and infrastructure can often be much wider. The systems in cities are closely connected within themselves and with other cities and regions and can be affected by any failure in that complex structure. Floods can damage residential areas and business sites and cause loss of jobs and services such as maintenance of energy, transportation, or clean water. Heat waves can be detrimental to public health, reduce citizens' ability to work, and cause trouble for services and social life. In addition, damage to roads results in problems with the supply of goods. All of these consequences can put economic pressure on a city[11]. Thus, a climate change adaptation requires a broader perspective of risk reduction, resilient response and sustainable development [1].

2.2. Linking Risk and Resilience

In recent years, resilience has gained the attention of many academic studies and policies from various disciplines and sectors. Observed climate change impacts, uncertainty, and increasing risk have made resilience a major discussion topic for cities [11].

According to UNISDR[12], resilience is *"the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions"*. It implies a capacity to resist and overcome a disaster, as well as preparedness and reparation. Resilient thinking transcends prevention, control, or resistance to extreme weather events and instead adopts a framework of learning, evolution, and adaptation [12]. A resilient city learns from experience and adapts itself to a more risky environment [13] instead of struggling with it and as such, it rids itself of its rigid structure and becomes more flexible and adaptable to new conditions.

Resilience to climate change includes adaptation and risk reduction, especially for critically vulnerable areas [14]. Indeed, there is a strong relationship between risk and resilience in terms of the challenge of climate change. In order to be prepared for climate change threats, reduce risk, increase the safety in cities, and sustain economic viability and social wellbeing, cities must be more resilient. Unless cities adopt

[9] *UNISDR. How to Make Cities More Resilient: A handbook for local government leaders. A contribution to the global campaign 2010–2015*, 2012. Geneva.

[10] UNFCCC (United Nations Framework Convention on Climate Change). Climate Change: Impacts, vulnerabilities, and adaptation in developing countries. 2007

[11] EEA. Urban adaptation to climate change in Europe: Challenges and opportunities for cities together with supportive national and European policies, 2012, Copenhagen.

[12] UNISDR, 2009, p. 24.

resilient development, the risk will remain and increase in vulnerable areas[13].

Reducing risk can be an opportunity to improve economic, natural and social conditions, deal with unpredictable or uncertain shocks, and make communities more secure than before[14]. Decreased resilience means increased vulnerability to uncertainties and surprises for a community that generates risk and can cause system crises or chaos in smaller disruptions or stresses[15].

2.3. Climate Change Risk Assessment

Risk assessment is an inherent part of risk reduction and resilient development [15]. In order to understand risks and make accurate decisions about risk reduction, risk factors, including all kinds of city services and sectors, should be analyzed [6]. Risk analysis and risk assessment are needed to inform decision makers, prioritize projects, determine risk reduction measures, and identify high, medium, and low risk areas by considering vulnerabilities, cost, effectiveness, and interventions. Based on its exposure and vulnerabilities, each local and urban structure is affected by climate-related disasters and natural hazards differently and has a different level of risk[16]. Therefore, risk assessment should consider exposure and vulnerability in a multidimensional and integrated approach [16].

The literature doesn't suggest a universally accepted approach to risk assessment[17] [9]. However, recent studies emphasize a risk-based multi-dimensional assessment approach for the effective urban development [14]. The risk literature emphasizes the terms *'probability'* and *'consequences'* as shown above. Snover et al. [17] have created a risk assessment framework from this perspective and defined probability as the likelihood of a climate hazard to occur and consequences as the social, economic, cultural, or natural impacts of any climate hazard[18]. According to Snover et al. [17], each sector of a complex city system should be analyzed individually, in terms of the impacts and probability of any climate-based risk in order to assess the risk. The impact of potential risk on each sector would be different in a city structure. Therefore, urban systems require an assessment of each vital sector in the city to reveal the differences in risk levels.

3. Climate change risk assessment of Istanbul's urban sectors

3.1. Initial remarks

The population of Istanbul has already reached 15 million according to official numbers[19]. The economically powerful location of Istanbul has made it a center of migration in Turkey since the 1950s. The city is unique in Turkey, being not only the most populated city but also a center of culture, tourism and national and international trade. It has a particular value among the world's metropolitan cities as well, with its history, resources and geographical location. Its service hinterland extends to the other 80 provinces of Turkey in terms of social facilities and the central offices of national or international institutions. The GDP of the service sector in Istanbul makes up 1/5 of the national GDP[20]. In 2018, the GDP

[13] UNISDR.. Making cities resilient: My city is getting ready, 2010–2011. World Disaster Reduction Campaign. 2010.

[14] UNISDR, 2012.

[15] Resilience Alliance.A Research Prospectus for Urban Resilience: A resilience alliance initiative for transitioning urban systems towards sustainable futures. 2007.

[16] *Ibidem*.

[17] Climate change impacts and the urban development process are complex and sometimes unclear, therefore the assessment is difficult.

[18] A multidimensional approach to climate change risks in terms of their likelihood and consequences is required in order to understand the interrelation of various climate-related risks.

[19] http://www.turkstat.gov.tr, date retrieved 01.03.2018.

[20] IMP (İstanbul Büyükşehir Belediyesi İmar ve Şehircilik Daire Başkanlığı Şehir Planlama Müdürlüğü). 1/100.000 Ölçekli İstanbul Çevre Düzeni Planı Raporu. 2009.

per person was $16,264 in Istanbul, while it was $9,693 in the rest of Turkey[21].

Istanbul, being an economic and cultural center with a dense population and a variety of social and economic activities, has high risk in terms of any external stresses. Istanbul has always had an earthquake risk and the city has experienced very destructive earthquakes and suffered from lack of preparation [18]. In recent years, terror risks have increased in the city, in conjunction with general distress in the Middle East region and Istanbul has faced many terrorist bomb attacks in the last few years[22] because of its pivotal position in Turkey. In addition to these specific stresses, Istanbul also suffers from other natural disasters and the impacts of climate change, such as heat waves, extreme weather events, flooding, as well as others. These examples prove that not only Istanbul but also Turkey would be impacted severely if any climate-based disaster case occurs in Istanbul.

As previously mentioned, climate change risk is one of the most discussed topics globally, and the impacts of such change can be eliminated by local, national and international cooperation, relevant strategies and effective policies. Therefore, these multi-scale efforts take important place in the mitigation and adaptation measures to climate change effects. Increasing the urban resilience is essential for the sustainability of social and economic activities and viability of the city. Even though Istanbul's economic and social structure creates advantages from certain aspects, the vulnerability of it to external stresses is highly critical.

In this study, Istanbul is chosen for the case study because of its geographical location, socio-cultural values, and economic importance in Turkey. Since it is the most important center in terms of economic activity and population, it is urgent that the risk of climate change in Istanbul be considered. Therefore, this study aims to assess the level of risk generated by climate change on urban sectors in Istanbul. The methodology defined by ICLEI [17] has been followed to assess the risk levels. According to the definitions in that guidebook, 11 urban sectors[23] and 25 sub-sectors – planning areas – are identified as shown as *Table 1*. The 11 sectors are defined considering development strategies are likely to be affected by climate-related disasters and critical for economic viability and public health of the city. Related planning areas are defined in the frame of the ICLEI definition, which covers major urban issues and services.

This study is a part of a comprehensive resilience assessment study of the 11 selected urban sectors. The resilience study consists of 3 parts: vulnerability assessment, risk assessment and prioritization assessment[24]. The overall result of these studies will help decision makers to formulate strategies to eliminate the climate change risk, decrease climate-related vulnerabilities and increase urban resilience and adaptive capacity, starting with the most critical sectors.

[21] http://www.turkstat.gov.tr (accessed: 06.05.2020).

[22] http://www.diken.com.tr, "Bir Buçuk Yılda 33 Bombalı Saldırıda 461 Kişi Hayatını Kaybetti" (accessed: 08.02.2018).

[23] ICLEI defines sectors as "any resource, ecological system, species, management area, activity, or other area of interest that may be affected by climate change" [12, p. 5].

[24] The first part has been completed and suggests that the most vulnerable urban systems are urban risk areas, heat, biodiversity, and sea transit followed by energy production, water supply, storm water management, water quality, agricultural land maintenance, public transit, social facilities, disaster response, and historical and cultural heritage. The least vulnerable systems are recycling and waste collection, fire safety, sewage system and urban renewal [5]. In the present study, we evaluate the risks of the same sectors and planning areas. In the last part, which will be the focus of our next study, we will combine the vulnerability and risk assessment results and will present an overall resiliency score for each planning area.

Table 1. Sectors and planning areas

Sectors	Planning Areas
Water Resources	Water Supply
	Water Quality
Health	Heat
	Air Quality
Energy	Energy Demand
	Energy Production
Agriculture	Agricultural Land Maintenance
	Crop Diversity
Transportation	Sea Transit
	Road & Bridge Maintenance
	Public Transit
Development & Land Use	Urban Renewal
	Affordable Housing
	Social Facilities
	Urban Planning
Public Safety	Fire Safety
	Urban Risk Areas
	Disaster Response
Infrastructure	Sewage Systems
	Storm Water Management
Ecology & Biodiversity	Biodiversity
	Green Spaces
	Urban Forest Management
Culture	Historical & Cultural Heritage
Materials	Recycling & Waste Collection

3.2. Methodology

ICLEI Guidebook [17] defines risk with two components; the consequences of an impact and its probability or likelihood:

$$Risk = Consequemce \times Probability.$$

The consequence of an impact represents the estimated or known consequences of a particular climate change impact, e.g. the cost and the size of the land area or population affected. In this study, four main types of consequences are investigated: *"economic consequences", "ecological consequences", "social consequences",* and *"cultural consequences"*[25]. The cumulative results of consequences are evaluated as high, medium or low. The likelihood or probability of an impact answers the question *'what is the probability of a projected impact occurrence?"*. Some kinds of climate change impacts are certain and can be observed in the present day, while others are less so. By considering the extent to which such changes affect ongoing problems or generate new problems, the certainty level is determined. The evaluation of the certainty and uncertainty of impacts is ranked as high, medium, and low probability.

[25] Economic consequences are concerned with how costly the damage or repair will be, in addition to the cost of the preventing measures. Ecological consequences refer to how the environment and ecosystem will be affected. Social consequences encompass how citizens will be affected, e.g. whether there is any life-threatening impact, or which group of citizens will be affected. Cultural consequences concern any effect on culture and if present, how it may change cultural behavior.

As a first step, the relevant data on climate change were gathered from institutions and publications[26]. For the next step, in-depth interviews were carried out with 54 interviewees between April and December 2014. The interviewees were determined using snowball sampling methodology among representatives of institutions and companies, experts, academics, scientists, and researchers. The respondents selected by considering most active stakeholders on the specific sector or planning area. From this perspective the interviews were conducted to representative of 42 public institutions, 5 private institutions, 4 academics and 3 NGOs. Public institutions dominate the distribution of interviewees since they are the most important decision makers in İstanbul's urban system. A semi-structured questionnaire as seen in *Table 2* was prepared for the interviews to discover the approaches of the actors and institutions to climate change, the importance of climate change in their agenda, their awareness, their strategic approach to climate change mitigation and adaptation. The interview outputs were used to interpret the risk levels of sectors from the relevant institutions' and actors' perspectives.

The final risk level is evaluated considering both the consequences and probability of impacts using a risk assessment index. In order to combine those results, quantitative scores are given for each. Consequences are scored as 1, 2, and 3 for low, medium, and high results, respectively. Whilst probabilities are also scored as 1, 2, and 3 for low, medium, high probability, respectively. The consequences and probability scores are combined in a matrix in order to score the overall risk level. *Table 3* presents the score matrix of the risk assessment. Risk levels are categorized as high risk (score 6-5), medium risk (score 4) and low risk (score 3-2).

Table 2. Questions of the semi structured questionnaire[27]

Risk Factors		*Which climate-based risks the related urban sector confronts?*
		In which direction do the consequences of the expected climate risks affect the urban system?
Probability		*What is the probability of the occurrence of those risks?*
Consequences	Threats	*Is there any life-threatening situation for citizens?*
		Is there any threat to the ecological balance?
		Is there any threat to the culture?
	Cost	*How costly are the actions that would prevent the risks?*
		How costly is the recovery after any disaster happens?

Table 3. Risk assessment matrix

	High Consequence (3)	Medium Consequence (2)	Low Consequence (1)
High Probability (3)	6 (High Risk)	5 (High Risk)	4 (Medium Risk)
Medium Probability (2)	5 (High Risk)	4 (Medium Risk)	3 (Low Risk)
Low Probability (1)	4 (Medium Risk)	3 (Low Risk)	2 (Low Risk)

[26] The information taken from institutions are: their current programs, policies that may support climate change adaptation or/and mitigation, projections on climate change, future expectations about demographic, structural or economic structures, investments, and plans.

[27] We constructed the semi-structured questionnaire in 4 parts; the first part attempts to discover climate change risk factors, the second part to evaluate the probability of the risk to occur, the third part to investigate the expected economic, social, ecologic and cultural threats, and finally the last part tries to estimate the cost of the hazards.

3.3. Empirical results

3.3.1. Water resources

Water resources are at risk because of unplanned settlements, unwise land use decisions, and uncontrolled urban development. Climate change will inevitably cause a decrease in rainfall and drought. Increasing temperatures will lead to drops in the water levels of reservoirs through evaporation and water scarcity is thus a very real possible result of climate change. In turn, water resources may become polluted due to leakage, storms, and erosion caused by extreme weather events. Polluted resources create serious costs in treatment and supply. Water is a basic need for human life, and poor water quality and inadequate water service create life threatening risk for citizens. Keeping water resources clean is also very important ecologically. Ecological sustainability depends on water quality and the preservation of resources.

Even today, a decrease in water supply has arisen as a consequence of increasing temperatures. The probability of the impacts on water supply is almost certain. However, climate change has an indirect impact on water quality meaning, the probability is medium (*Table 4)*.

3.3.2. Health

The most obvious climate change impact is an increase in heat and longer summer periods. It is also expected to change the ratio of air components, which will cause an increase in air pollution, a decrease in air quality where it is hotter, and the deterioration of the atmosphere.

Changes in climate will result in increases in respiratory diseases, allergies, skin cancer and asthma even deaths and diseases. An increase in heat will also lead to an extending of disease vectors such as mosquitos around unqualified environment. Climate change and decreasing air quality will create extra health costs. Ecology will also be directly affected by the decreased air quality and increased heat. All citizens will be affected, but elderly, sick people, children and outside workers are at greater risk groups which constitute half of the population. In terms of cultural behavior, slight changes may occur in citizens' daily life habits, and people may spend less time outside We have already observed increased temperatures, especially in summer time, and decreased air quality. As such the projected effects are highly possible (*Table 5)*.

3.3.3. Energy

Turkey depends on external resources of energy as it can only produce 40% of its energy demands. Istanbul has a rapidly growing population generating higher energy demand. Renewable and clean energy resources are not sufficient and fossil fuel is still the main energy resource. Due to climate change, the seasonal energy demand for heating and cooling will change. The demand for cooling energy is expected to increase in summer while the demand for heating will decrease in winter. Energy production will be costly,

Table 4. The risk assessment of water resources

Planning area	Consequence	Probability	Risk Level
Water Supply	High C.(3)	High P.(3)	High R.(6)
Water Quality	High C.(3)	Medium P.(2)	High R.(5)

Table 5. The risk assessment of health

Planning area	Consequence	Probability	Risk Level
Heat	Medium C.(2)	High P.(3)	High R.(5)
Air Quality	High C.(3)	High P.(3)	High R.6)

Table 6. The risk assessment of energy

Planning area	Consequence	Probability	Risk Level
Energy Demand	Medium C.(2)	High P. (3)	High R.(5)
Energy Production	Medium C.(2)	High P.(3)	High R.(5)

with increasing population and demand. More energy consumption will bring more cost for individuals especially. The probability of a climate change effect is high since it can obviously be observed (*Table 6)*.

3.3.4. Agriculture

Climate conditions also affect agricultural productivity. The fertility of each crop may change depending on climate. Climate change will lead to less precipitation and more drought periods. Irrigation systems need more improvements because of the potential water scarcity. Agricultural production in Istanbul is low in comparison to the rest of Turkey. Istanbul is a rapidly growing city, which puts agricultural lands in danger of urbanization. Pollution is another factor that creates risk for agricultural land maintenance. The agricultural production in Istanbul is not sufficient for the population and the population is dependent on the production of other regions of Turkey. The decrease in agricultural activity will cause an increase in dependence. However, this does not create a serious risk for citizens and is not a life-threatening situation. Ecological patterns will change depending on climate conditions, and farmers should adapt to new conditions and learn about compatible crop patterns. Recently, the destructive impacts of climate change have been observed in the agriculture sector which reveals that the probability of the risk is high (*Table 7)*.

3.3.5. Transportation

Istanbul suffers heavily from traffic problems, especially during peak hours. There are different modes of public transportation such as buses, subways, ferries, and. the increase in frequency and severity on extreme weather events as a result of climate change will affect transportation negatively. Roads and bridges will need constant maintenance because of the damage suffered in weather events like heavy rain, snowing and floods. Sea transit is essential for the connection of the two sides of Istanbul. However, its proportion in the transport system is low (2%). Such transit is highly affected by climate conditions. Public transportation is also important in terms of protecting the environment and ecosystems. All citizens are affected, but apart from traffic accidents, the impacts of climate change will not threaten lives in this sector. The probability of climate change effects such as extreme weather conditions are highly possible for Istanbul (*Table 8)*.

Table 7. The risk assessment of agriculture

Planning area	Consequence	Probability	Risk Level
Agricultural Land Maintenance	Medium C.(2)	High P.(3)	High R.5)
Crop Diversity	Medium C.(2)	High P.(3)	High R.(5)

Table 8. The risk assessment of transportation

Planning area	Consequence	Probability	Risk Level
Sea Transit	Low C.(1)	High P.(3)	Medium R.(4)
Road & Bridge Maintenance	Medium C.(2)	High P.(3)	High R.(5)
Public Transit	Low C.(1)	High P.(3)	Medium R.(4)

3.3.6. Development & Land Use

The Istanbul Metropolitan Municipality, District Municipalities and Housing Development Administration produce affordable houses for low income citizens, especially in their proposals to transfer settlements in risk areas. However, it is not possible to transfer all slums and informal settlements into affordable housing. Severe weather events resulting from climate change will cause more damage, especially in risk areas, and as a result the demand for affordable housing is expected to increase. The growing population and migration to the city have also increased the demand for housing. In Istanbul 25,000 buildings are under transformation and it is thus essential to reduce risk and produce higher-quality buildings. After the 1999 earthquake, which inflicted serious damage on Istanbul, the need for higher quality building structures was recognized. Climate change will have more severe impacts on low-qualified buildings. The Istanbul Development Plan includes both strategies that contribute to sustainability and measures to mitigate climate change impacts. Istanbul lacks urban facilities in some districts. The amount of green area per person is less than standard. The plans propose new urban facilities for new development areas. In old and unplanned settlements, the lack of urban facilities is still a problem. Insufficient urban facilities decrease the quality of the environment and of life.

Economically, urban renewal is affordable, and the private sector has taken an active role in such activities. However, building-based transformation cannot eliminate risk totally. The lack of urban facilities and open spaces is a problem for the environment. The sprawl of urban areas threatens the ecology around the city. Low-income groups and people living in urban risk areas would thus be more affected by climate change impacts. Nevertheless, all citizens will be affected by the decisions of the plan, which is insufficient to reduce risk in some settlement areas. Culturally, people's lifestyles may change depending on the architectural style of their houses or neighborhoods.

Affordable housing is continuously produced in the city and there is uncertainty concerning climate change impacts on affordable housing and urban facilities. The impacts of climate change on the urban planning area is certain. Therefore, the probability is medium in planning areas except urban planning that is high (*Table 9)*.

3.3.7. Public safety

Istanbul frequently faces climate-based disasters. Flooding, storms, and drought are frequent climate related disasters occurring in the city and projected to be more so with climate change. Urban risk areas are vulnerable to any climate-based disasters. Unplanned and unofficial settlements where low income people live are located in those risk areas and are habitually exposed to climate disasters like flooding. Climate change will cause more disaster in risk areas like flooding will be more severe and frequent, and storms will be more harmful. Drought and heat cause fires in urban areas and forests.

Table 9. The risk assessment of development & land use

Planning area	Consequence	Probability	Risk Level
Urban Renewal	Medium C.(2)	Medium P.(2)	Medium R.(4)
Affordable Housing	Medium C.(2)	Medium P.(2)	Medium R.(4)
Social Facilities	Medium C.(2)	Medium P.(2)	Medium R.(4)
Urban Planning	High C.(3)	High P.(3)	High R.(6)

Disasters may have already damaged ecosystems. Citizens, especially those living in risk areas, may face life threatening situations. Renewal is a basic tool to decrease the risk in urban risk areas. Another tool is expropriation, which could be used to wipe out settlements in flood pains and high-risk areas. However, it is not possible to take such precautions in all urban risk areas, and it is very costly where such action is feasible. The city's fire department is well organized and improving. Not all citizens are affected in any fire situation. However, fires may pose a severe threat to people. The probability of occurrence of the risk is high (*Table 10)*.

3.3.8. Infrastructure

Istanbul's storm water system is not sufficient for the dense population needs for example, in any heavy rain event, water overflows from pipelines. Climate change and relational extreme weather events make overflowing more severe and frequent. In some districts of Istanbul, wastewater is discharged into the streams or sea directly. The city's growing population and density may create problems for the system, and so the capacity of the sewage system should be increased. In order to prevent overflows, pipelines should be changed taking into account climate change impacts. Moreover, more penetrable surfaces should be created in the city. Such precautions are costly for the municipal government. Overflows and direct sewage charges may also be ecologically detrimental. They create life threatening situations for citizens, especially for those living in risk areas, flood plains, or slums. In some dense and populated districts, the comfort level may decrease because of insufficient sewage systems. Overflows cause large flooding that leads to deaths and property loss. The risk concerning storm water management can be observed currently. The multiplied effects of climate change will make the risk greater. However, the consequences are not certain for sewage systems (*Table 11)*.

3.3.9. Ecology & biodiversity

In Istanbul, ecologically important areas are confronted by the risks of urbanization, overconsumption, and deterioration due to human activities. Climate change and extreme weather events are detrimental for biodiversity, trees and green areas. Drought is a problem for irrigation and green areas are maintained by the municipality regularly. Climate conditions may damage the design of green areas, plants and parks. The green areas in the city are becoming smaller because of urbanization. Climate change will require more and constant maintenance of green areas. Extreme storms may uproot trees and increase loss of urban forest areas due to these factors and also city expansion are also harmful for ecology and decreases citizens' comfort level, air quality and accessibility to green areas. The habits of people

Table 10. The risk assessment of public safety

Planning area	Consequence	Probability	Risk Level
Fire Safety	Medium C.(2)	High P.(3)	High R.(5)
Urban Risk Areas	Medium C.3)	High P.(3)	High R.(6)
Disaster Response	Medium C.(2)	High P.(3)	High R.(5)

Table 11. The risk assessment of infrastructure

Planning area	Consequence	Probability	Risk Level
Sewage System	Medium C.(2)	Medium P.(2)	Medium R.(4)
Storm Water Management	High C.(3)	High P.(3)	High R.(6)

in green areas may change. The probability of the risk is uncertain for green spaces and urban forest management; however, biodiversity is already at risk in Istanbul (*Table 12)*.

3.3.10. Culture

Climate conditions directly affect historical buildings. Traffic pollution causes darkening of facades, and rain and snow cause cracks in walls. Climate change will negatively affect the city's historical heritage. The damage caused by climate conditions will be multiplied with more frequent and extreme weather conditions. However, since historical buildings are constantly maintained, climate change will not incur extra costs. For citizens, it does not create life-threatening situations. However, for those living in old, historic and registered buildings, climate change may create a risk. Those buildings may need restoration, which may be costly for residents. Climate change will also certainly have an impact on the sector (*Table 13)*.

3.3.11. Materials

Leakage from storage areas to underground water is a risk for the environment. However, the leakage is prevented by special construction techniques, and methane gas is collected by pipes. Climate change may increase the environmental risk, but necessary controls are performed regularly. Technological improvements are used to protect the environment.

Climate change does not generate considerable risk for this sector, and the consequences are not certain (*Table 14)*.

3.4. The Risk Levels of All Sectors and Planning Areas

In *Table 15*, the summary of the risk assessment is presented, and the risk scores and levels of all sectors are indicated.

The planning areas under risk are determined considering economic impacts and their cost, detrimental ecological impacts, impact on citizens, how many people are affected and whether there is any life-threatening situation and if so, what the impact on the culture will be. The probability of climate impacts is also included. Costly, life threatening, ecologically detrimental, culture-altering impacts and high possibility create high risk in planning areas.

According to the results, *water supply, storm water management, urban planning, air quality, and urban risk areas,* have the highest risk regarding climate change. The planning areas of *biodiversity, energy production, road and bridge maintenance, water quality, disaster response, energy demand, fire safety, crop*

Table 12. The risk assessment of ecology & biodiversity

Planning area	Consequence	Probability	Risk Level
Biodiversity	Medium C.(2)	High P.(3)	High R.(5)
Green Spaces	Medium C.(2)	Medium P.(2)	Medium R.(4)
Urban Forest Management	Medium C.(2)	Medium P.(2)	Medium R.(4)

Table 13. The risk assessment of culture

Planning area	Consequence	Probability	Risk Level
Historical & Cultural Heritage	Medium C.2)	High P.(3)	High R.(5)

Table 14. The risk assessment of materials

Planning area	Consequence	Probability	Risk Level
Waste Collection & Recycling	Low C.(1)	Medium P.(2)	Low R.3)

Table 15. Risk levels of all sectors and planning areas

Sector	Planning Area	Risk Level (Score)	Average Risk Score
Water Resources	Water Supply	High (6)	5.5
	Water Quality	High (5)	
Health	Heat	High (5)	5.5
	Air Quality	High (6)	
Energy	Energy Demand	High (5)	5
	Energy Production	High (5)	
Agriculture	Agricultural Land Maintenance	High (5)	5
	Crop Diversity	High (5)	
Transportation	Sea Transit	Medium (4)	4.3
	Road & Bridge Maintenance	High (5)	
	Public Transit	Medium (4)	
Development & Land Use	Urban Renewal	Medium (4)	4.5
	Affordable Housing	Medium (4)	
	Social Facilities	Medium (4)	
	Urban Planning	High (6)	
Public Safety	Fire Safety	High (5)	5.3
	Urban Risk Areas	High (6)	
	Disaster Response	High (5)	
Infrastructure	Sewage Systems	Medium (4)	5
	Storm Water Management	High (6)	
Ecology & Biodiversity	Biodiversity	High (5)	4.3
	Green Spaces	Medium (4)	
	Urban Forest Management	Medium (4)	
Culture	Historical & Cultural Heritage	High (5)	5
Materials	Recycling & Waste Collection	Low (3)	3

diversity, historical and cultural heritage, heat and agricultural land maintenance also have a high risk. Any impact on those planning areas will negatively affect many people living in the city and may even cause life threatening situations. Recovery or adaptation to such risk is costly in many cases. Climate change also creates ecologically problematic conditions and cultural alterations. The planning areas of *green spaces, sea transit, sewage system, public transit, social facilities, affordable housing, urban forest management and urban renewal* have lower risk. The lowest risk planning area is *recycling & waste collection*. These planning areas have relatively lower risk scores because they don't create life-threatening risk.

The average risk scores of each sector has also been calculated using the risk scores of planning areas and assuming all planning areas within a sector have the same impact on sector's risk level. In terms of sectors in the assessment, *health and water resources* has the highest risk with a score of 5.5 followed by *public safety* with 5.3 and *energy, agriculture, infrastructure and culture* with a score of 5. The *development and land use* sector has medium risk with a score of 4.5, and the *transportation* and *ecology and biodiversity* sectors have a score of 4.3. The *materials* sector has the lowest risk score with 3. As a result, out of 25 planning areas, 5 have the highest risk score (6), 11 have a high-risk score (5), 8 have a medium risk score (4), and 1 has a low risk score (3). The sectors have highest risk scores should have priority in planning practice.

Concluding remarks

The resilience level of a city is based on its vulnerabilities and the risks that the city is expected to confront. Therefore, while moving

towards a resilient development, risk assessment has great importance. The risks should be determined and expected impacts on the city system should be measured. The determination of risks and expected consequences is important in reducing uncertainty. On the other hand, knowing the vulnerabilities of sectors is critical in assessing the resiliency of an urban system. A study on the vulnerability assessment of those sectors was recently completed by Aygün and Baycan [5] as a part of a more comprehensive resilience study. According to this vulnerability study, the most vulnerable planning areas are *biodiversity, heat, urban risk areas and sea transit*. Other high-level vulnerable planning areas are *historical and cultural heritage, water quality, energy production, disaster response, water supply, social facilities, public transit, storm water management*, *agricultural land maintenance*. When we probe the highest scores in both studies, it is obvious that the vulnerable and risky planning areas are mostly overlapping. It can be claimed that high vulnerability creates high risk for a sector, while high risk creates high vulnerability as well. These two concepts are interrelated and inseparable in the field of resilience.

The results of the study clearly indicate that Istanbul's urban development process over time and the current settlement pattern are the main causes of climate-related risk in the city. The rapid migration and as a result rapid urbanization formed urban development in risk areas such as river basins or geologically unsuitable areas most of which are informal settlements. The Urban Heat Island effect increases due to dense settlement pattern, lack of green areas and wind corridors. As a result, the vulnerability of the settlements to heat, heat waves and extreme weathers increase. Moreover, ecology and water resources are at risk due to the pressure on natural areas and resources caused by sprawling urban settlements to peripheral areas and increasing population. Furthermore, the city suffers from an insufficient infrastructure system especially in old and dense neighborhoods. It is not sufficient for the population or any extreme precipitation. The major problem that revealed in this study is that the city is lacking the balance between capacity of the urban system such as resources, infrastructure, facilities, management abilities, etc., and the density of population, settlements, and demand.

This study is a starting point for resilient development in Istanbul. Future studies can be constructed on the results of this study. The results address the weaknesses and opportunities of the city system in a comprehensive way which can also direct future actions toward resilience. The starting point of resilient development is critically important for decision makers because it is a long-term process that should be started from the right spot immediately. The climate change impacts have already been observed, and its negative effects have harmed risky and vulnerable sectors. The requirement for preparedness is urgent. It is important that academics contribute to the research and pathways on this top topic.

Climate change research is a new topic in Turkey, therefore, we confronted difficulties finding data for the risk assessment study. The institutions were not able to give relevant information and lacked effective coordination and data collection systems. The climate change concerned studies were very limited in institutions. Therefore, during the in-depth interviews, we needed to combine their point of views on risk with climate change. In Turkey, it is obvious that effective data collection systems, coordination between institutions, and an increased awareness of climate change are primarily necessary.

Since 2014, when these in-depth interviews were conducted, the awareness of climate change has increased in institutional level in Istanbul. In 2018 "Istanbul Climate Change Action Plan" prepared together with 'GHG Inventory Report', 'Climate Change Scenarios Report', and 'Climate Change Risk, Opportunities and Vulnerabilities Assessment Report'[27]. These assessment reports significantly address the same risks and vulnerabilities with this study. However, the regional development plans or local implementation plans still don't consider climate change impacts and risk reduction strategies. Therefore, the climate change risk levels of sectors defined in this study remain the same, even in 2020.

Vulnerabilities and risks may change over time, and strategies may work or fail. A fixed tracking system is thus a necessity. New technological improvements, economic conditions, changing demands are important factors in the risk levels of urban systems. Non-climatic alterations may also negatively or positively impact a system's risk level. Therefore, the reassessment of risk levels of the sectors is inevitable over time. The next step should be developing policies and strategies to decrease risk and increase resilience. The most vulnerable urban systems and risk factors should be considered carefully by decision makers. At the same time, the risk reduction strategies should be integrated into development and implementation plans. Citizens also have a critical role in a resilience development. They should be informed, educated and involved in sustained collaboration. Any action without the participation of citizens would be meaningless in an urban system.

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The Link between Unemployment and Industrial Production: The Fourier Approach with Structural Breaks

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Abstract. The purpose of this study was to investigate the long-term relationship between unemployment and industrial production during structural breaks in the United States. We used monthly data from the Industrial Production Index and the unemployment rate between January 1948 and October 2018 to analyze this relationship. We found the stationarity of the time series used using the Fourier KPSS stationarity test, which enabled a stationarity analysis, including with the existence of structural breaks. As a result of the stationarity analysis, we did not find any stationarity in either series. We then used a Fourier Shin cointegration analysis to investigate the long-term relationship between the industrial production index and the unemployment rate. This test demonstrates its difference from other cointegration tests considering the time and shape of these breaks in the presence of structural breaks. According to the cointegration analysis results, we found a long-term relationship between the U.S. unemployment rate and the industrial production index variables. These results indicate that sudden structural changes in the industrial production index have an effect on the U.S. unemployment rate in the long term. We then used the Least Squares with Breaks Bai-Perron break type method to determine the structural break periods and the coefficients of these periods. We found the years 1958, 1974, 1990, and 2007 to be when the structural changes occurred.

Key words: Fourier KPSS stationarity, Fourier SHIN cointegration, growth, structural breaks, unemployment rate, industrial production.

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Introduction

Initial contribution to growth theory includes two periods – the late 1950s and 1960s that form neoclassical growth theory. Robert Solow made the greatest contribution to neoclassical growth theory. The second period, called intrinsic growth theory and led by Robert Lucas and Paul Romer, includes the late 1980s and 1990s [1].

It is important for policy makers to know how exactly GDP growth by 1 p. p. will reduce the unemployment rate. In 1962, Arthur Okun suggested that the increase of economic growth would reduce the unemployment rate. According to this theory, known as Okun's Law, economic growth (stated as the output increase in production) has an important effect on full employment. In other words, there is an inverse relationship between the output increase of production and the unemployment rate [2]. Unemployment is a primary issue for economic managers all over the world. Increasing unemployment rates, especially during periods of economic crisis, create a serious problem for the full-employment target that is one of the macroeconomic goals of all countries. Unemployment is also considered one of the reasons of poverty and unfair distribution [3]. Most people around the world earn most of their income by working at a profession. This point indicates the importance of having opportunities for employment, business quality, high income, conditions for economic growth, and the decrease of poverty. Developing countries continue to believe that employment has an important effect on development and prioritize providing employment to reduce poverty when creating development policies [4].

After the petroleum crises in the 1970s, the United States began to deal with low-growth and high-unemployment problems. Crises such as the increase in female-labor employment, the stationarity of productivity and wages made economists think that a structural change had occurred in the relationship between economic growth and unemployment. This also led to approaching Okun's Law with suspicion. Studies have indicated that Okun's coefficient regressed from three to two [5]. Along with the United States, industrialized European countries in particular deal with high unemployment rates cyclically, sparking discussions among economists about the fact that these problems derive from structural issues, rather than cyclical situations [6].

The purpose of this study is to identify structural breaks in the relationship between unemployment and growth and examine this long-term relationship in light of these structural breaks. The reason why the industrial production index is taken as a variable representing growth is that it allows a better view of structural changes in production. The industrial production index shows the dynamics of production output and emphasizes structural developments in the economy [7]. For this reason, we used the Fourier Cointegration Approach, which allows the existence of cointegration relationship in the presence of structural breaks, in the study. Thus, the relationship between variables could be analyzed to show structural changes.

In this study, we examined the long-term relationship between the industrial production index and unemployment rate using data from January 1948 to October 2018 for the United States. This paper is organized as follows: an introduction where general information is given; the literature review, where the literature on the subject is summarized; a section in which the method is explained, the data description and results of the analysis; conclusions and the list of references.

Literature overview

Since 1962, when Arthur Okun revealed the existence of an inverse relationship between economic growth and the unemployment rate, economists have continued investigating this issue. The relationship known as Okun's Law was accepted as a structure that did not require a valid hypothesis process [2]. Beginning with Okun's article (1962), bringing forward the relationship between economic growth and unemployment, researchers reached similar findings indicating that a 2–3% increase of real gross domestic product (GDP) leads to a 1% decrease in unemployment [8].

There are various opinions which explain the dynamics of this relationship in studies dealing with unemployment and economic growth. According to Meyer and Tasci (2012), the relationships between macroeconomic variables are more complicated than the simple relationship stated by Okun's law. Researchers argue that there is no clear evidence that the relationship between output growth and the unemployment rate is stable over time. Therefore, they say that it is uncertain how the increase in real GDP will affect the unemployment rate [9]. According to Chamberlin (2011), structural changes occurring over time do not allow simply to explain the relationship between unemployment rate and economic growth. As a reason, the researcher says that the unemployment rate is affected by structural and cyclical movements [10]. Akeju and Olanipekun (2014) state that the industrial production system is shaped according to the change in total demand. Thus, changes in the labor market affect the unemployment rate. In addition, they expressed the opinion that the effect of the rate of the increase of production on unemployment is an important factor in combating inflation [11]. There are also opinions stating that changes in total output have an asymmetrical effect on the unemployment rate. According to these, the unemployment rate is more affected by shocks in the contraction periods compared to during the expansion periods of the economy [6, 12–14].

Studies analyzing the relationship between economic growth and unemployment for the United States continued to follow Okun. In his study, Blackley (1991) researched the validity of Okun's Law at the state level in the United States. He determined that this relationship was valid in 26 states. The study reveals that an average of 3.1% in economic growth is required to reduce the unemployment rate by 1% in a state. The differences in industrialization levels and fields of the states, as well as the age and gender distributions belonging to labor and taxation policies, affected differences between states in the relationship between unemployment and economic growth [15]. However, Palley (1993) reformed Okun's Law by considering the asymmetrical structure of the USA economic system. According to findings of the study, a break was identified in Okun's coefficient in 1974. At the same time, it was observed that the Okun coefficient increased [13]. Similarly, Silvapulle et al. (2004) obtained findings in support of the claim that the relationship between economic growth and unemployment, called Okun's Law, was asymmetrical. Using the data from the postwar period for the United States, the study discovered that the effect of the increase in economic growth on unemployment varied with regard to the decrease in short-term growth [14]. Guisinger et al. (2018) also estimated the Okun coefficients for each American state separately, focusing on reasons for differences in coefficients among the states. According to the study results, the rate of high education in the population, as well as the lower unionization rate and nonproduction employment, are among the main reasons for the coefficient differences among the states [16].

Using the data between 2002 and 2010 from 358 metropolitan statistics areas (MSAs) in the USA, Kuscevic (2014) tried to estimate Okun's Law by also considering the national shocks and spatial distribution effect for these cities. Because the research was carried out at a metropolitan level, not at a state level, it focused on whether there was a different spatial effect on unemployment. According to the research findings, the growth in MSAs had a small effect on its unemployment rate. These results suggest that unemployment at the city level in an integrated labor market, such as the United States, depends on changes in neighboring cities and the national labor market. The results also show that reasons for fluctuations of unemployment rates for metropolitan areas are different from reasons in other states [8].

Elshamy (2013) analyzed the Okun's coefficient for Egypt using the cointegration method with the data from the 1970–2010 period. Elshamy revealed that the Okun coefficient between unemployment and economic growth there was 2.2%. At the same time, Elshamy revealed the existence of a cointegration relationship and found a significant relationship in short and long terms [3].

Doğru (2013) researched the relationship between economic growth and unemployment in the Eurozone using annual data, including the 2000–2012 period. In the analysis, the panel cointegration method showed that Okun's Law was valid, but the calculated coefficients were below those of the United States and other developed countries. Doğru also determined that Okun coefficients of Eurozone countries differed from each other [17].

Beaton (2010) tested Okun's Law for the United States and Canada using the neutral median estimator method. According to the analysis results, the unemployment rate in both countries is highly sensitive to increases in economic growth and exhibits structural instability [18].

Lee (2000) analyzed the validity of Okun's Law for 16 Organization for Economic Co-operation and Development (OECD) countries using the data from 1955 to 1996. Lee's findings indicate that Okun's Law was statistically valid for most of the countries, but the coefficients differed among them. Okun coefficients are sensitive in terms of the first difference and gap models. Findings about the asymmetrical relationship were also reported, and the effect of the structural break that happened in the 1970s was quite strong [6].

Freeman (2000) measured the Okun coefficient using USA national and regional data. The study revealed that the value of the coefficient measuring the change in the economic growth and unemployment rate relationship was roughly 2 in all time periods and among regions [5].

Moosa (1997) tested the reactional relationship of unemployment and economic growth for G7 countries using the OLS, Rolling OLS, and SUR methods. According to Moosa's findings, the highest Okun coefficient was found for the United States and the lowest one – for Japan. Researchers appreciated that differences in markets could be the reason for the disparity [19].

Altug and Gencer (2012) examined industrial production and employment variables in their studies and investigated cyclical differences for developed and developing countries. They used Markov chains as a method. In the study, researchers examined the relationship between unemployment and change in the business cycle, considering that changes in industrial production are important in determining the turning points in a business cycle. Based on the Markov chain analysis, the researchers concluded that developed and developing countries are interdependent [20].

Akar and Sahin (2018) analyzed whether unemployment insurance is an automatic stabilizer in the business cycle in Turkey. For this purpose, the researchers used the Johansen cointegration, vector error correction model (VECM), and Granger causality methods to investigate the relationship between the industrial production index and unemployment. The researchers found a short-term causality relationship between unemployment allowance, unemployment rate, and industrial production [21].

Michael, Emeka, and Emmanuel (2016) examined the relationship between unemployment and economic growth in Nigeria. In the analysis, the researchers performed cointegration and causality analysis for real GDP, private consumption expenditures, and unemployment rate variables. The results showed a long-term relationship between the variables. According to the VECM, unemployment has an inverse and significant effect on real GDP. According to the causality analysis, there is a one-way causality from real GDP to unemployment [22].

Madito and Khumalo (2014) investigated the relationship between unemployment and economic growth in South Africa. In this study, researchers conducted a Johansen cointegration analysis with data from 1967Q1–2013Q4. For the short-term analysis, they used the VECM method. The Johansen cointegration test results revealed four cointegration vectors and showed a long-term relationship. According to the results of the study, 62% of economic growth is corrected every 3 months. In addition, there is a negative relationship between economic growth and unemployment [23].

Abbas (2014) investigated the long-term relationship between economic growth and unemployment using the ARDL boundary test. The researcher used 1990–2006 data for Pakistan. The study results showed a long-term negative relationship between economic growth and unemployment for Pakistan. The long-term coefficient, obtained in the study, showed that a 1% increase in economic growth will reduce unemployment by 1.65% in the long run. In the study, short-term coefficients were not significant [24].

Kangasharju, Tavera, and Nijkamp (2012) examined the relationship between unemployment and economic growth for Finland's regions. In this study, researchers used the hidden cointegration method, which takes into account cross-sectional dependence. The results of the study showed that, even though the coefficients are small for the regions in Finland, there is a cointegration relationship. Moreover, the long-term relationship between regional production and unemployment is asymmetrical, according to the results. The effect of GDP growth on unemployment was thus smaller in absolute value than the effect of the decrease in the GDP [25].

Kargi (2014) examined the relationship between economic growth and unemployment in OECD countries. Although there are differences in coefficients for 23 selected countries, Okun's hypothesis appears valid. The study revealed a long-term cointegration relationship between unemployment and growth. A consistent unemployment rate could not be detected in countries with high growth rates, but the unemployment rate was quite high in countries with low growth rates [26].

Palombi, Perman, and Tavéra (2015) examined the relationship between regionally based output in the U.K. and the unemployment rate. The aim of this study was to eliminate the problem of horizontal cross-sectional dependence by using a hidden cointegration method for the panel data. The results of the study show a hidden cointegration between unemployment and growth. At the same time, the relationship between economic

growth and unemployment was asymmetrical in the medium term, and the impact of GDP growth on unemployment was less than the absolute value of the impact of the decrease of the GDP on unemployment. Therefore, positive and negative shocks to the GDP have a limited impact on unemployment in the medium term [27].

Vakulenko and Gurvich (2015) examined the relationship between GDP and the unemployment rate in their studies for short and long term for Russia. In the study, they determined that the effect of the decrease in production on unemployment is higher than the effect of growth in production on employment. In the study, they also showed that the Okun coefficient calculated for Russia is close to values of a developing country [28]. In another study on Russia, Yüksel (2016) analyzed the causal relationship between economic growth, unemployment rate, and inflation. In the study, Granger and Toda-Yamamoto causality analyzes were performed using 1992–2014 data. According to the results obtained in the study, it has been determined that there is causality between the unemployment rate and growth in Russia [29]. In a similar way, unemployment and output dynamics in the CIS countries (Russia, Uzbekistan, Ukraine, Belarus, Moldova and Kazakhstan) were studied in 2017. According to the analysis for Russia, it is shown that a 1% increase of Russia's quarterly growth decreased the unemployment rate by 0.06%. In this study, researchers determined that the relationship between economic growth and unemployment rate in Russia has a stable course over time [30].

Methods

Fourier KPSS Stationarity Test

The issue on the stationarity of the series was first investigated during its analysis. In the 1980s, the first developed stationarity tests [31, 32] were used for an analysis of the level state of a time series along with its stable and/or trend interactions. However, these tests ignored the structural breaks in time series. Later stationarity tests considered the structural breaks [33, 34], but these tests were also criticized because the place, number, and form of the structural breaks should have been determined beforehand and only then included in the model. By developing the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test with the Fourier function, Becker, Enders, and Lee (2006) developed the Fourier KPSS stationarity test that considers the structural breaks in series, where the determination of a location, number, and form of the break is not necessary [35]. One of the most important advantages of this developed test is that it considers not only significant structural changes but also softer ones [36].

Becker et al. [37] first formulated the data production process given in Equations (1) and (2):

$$y_t = X_t'\beta + Z_t'\gamma + r_t + \varepsilon_t. \quad (1)$$

$$r_t = r_{t-1} + u_t\ . \quad (2)$$

Here ε_t indicates the stable error term, and u_t indicates the error term distributed identically with the σ_u^2 variant. Z_t is used to identify a break that may occur in a deterministic term; the structure that damages the linearity is expressed with Equation (3) [38].

$$Z_t = \left[sin\left(\frac{2\pi kt}{T}\right), cos\left(\frac{2\pi kt}{T}\right)\right]'. \quad (3)$$

Z_t is the vector that expresses the Fourier expansion and includes trigonometrical terms in it. The variable k indicates the frequency value, t indicates the trend term, and T indicates the sample size. $X_t = [1]$ is defined in the stationarity test of yt at level, $X_t = [1, t]$ is defined in the stationarity test in the existence of a trend. The null hypothesis expressing the stationarity is indicated as H_0: $\sigma_u^2 = 0$, and the test statistics are calculated with waste values

that would be obtained from Equations (4) or (5) to test this hypothesis [39]:

$$y_t = \alpha + \gamma_1 \sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 \cos\left(\frac{2\pi kt}{T}\right) + e_t. \quad (4)$$

$$y_t = \alpha + \beta t + \gamma_1 \sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 \cos\left(\frac{2\pi kt}{T}\right) + e_t. (5)$$

Although the stationarity at a level is tested by Equation (4), the stationarity in the existence of a trend is tested through Equation (5). Where the k value indicates the frequency value, selected for the Fourier approach, γ is the measure of the substitution and width in the approach. From this point of view, the test statistics are calculated as indicated in Equation (6) below [30]:

$$\tau_\mu(k) or\ \tau_\tau(k) = \frac{1}{T^2}\frac{\sum_{t=1}^{T}\tilde{S}_t(k)^2}{\tilde{\sigma}^2}. \quad (6)$$

where $\tilde{S}_t(k) = \sum_{j=1}^{t}\tilde{e}_j$. $\tilde{e}_j$ indicates the error terms in the OLS regression obtained from Equation (4) or Equation (5). As in the KPSS test, $\tilde{\sigma}^2$, the non-parametric estimation of the variant in the long term, is obtained by Equation (7) by selecting l, the cutoff lag parameter, and $w_j, j = 1, \ldots, l$, the weighting series:

$$\tilde{\sigma}^2 = \tilde{\theta}_0 + 2\sum w_j\,\tilde{\theta}_j. \quad (7)$$

Here $\tilde{\theta}_j$ indicates the error terms — for instance, autocovariances, obtained from Equation (4) or Equation (5).

F-test statistics, given in Equation 8, are recommended for testing the null hypothesis, $H_0: \gamma_1 = \gamma_2 = 0$, indicating the nonexistence of a nonlinear trend in the data production process:

$$F_i(k) = \frac{(SSR_0 - SSR_1(k))/2}{SSR_1(k)/(T-q)} \qquad i = \mu, \tau \quad (8)$$

Here, $SSR_1(k)$ indicates the error sum of squares obtained from Equation (4) or Equation (5), SSR_0 indicates the error sum of squares obtained from the model with no trigonometrical terms, and q indicates the number of explanatory variables. The fact that the null hypothesis cannot be rejected in the F test indicates the insignificance of trigonometrical terms. Critical values for the test appeared in the Becker et al. [37] study.

Fourier Shin Cointegration Test

Differences between the series are taken to provide the stationarity in nonstable time series. However, this is criticized because it leads to information losses in the long term. Cointegration analyses became popular because they enabled an analysis of the long-term relationship between variables without information losses. The Fourier Shin (FSHIN) cointegration test included by Tsong et al. [40] can be described as the expanded form of the Fourier KPSS test for cointegration. The main hypothesis in the FSHIN cointegration test indicates the existence of cointegration. This test reveals its difference from other cointegration tests considering the location, time, and form of these breaks. The FSHIN cointegration test is in two stages. In the first stage, the model is given in Equation (9) [41]:

$$y_t = d_t + X_t'\beta + \eta_t. \quad (9)$$

Here, $\eta_t = \gamma_t + \vartheta_{1t}$ is defined as $\gamma_t = \gamma_{t-1} + u_t$, $x_t = x_{t-1} + \vartheta_{2t}$. The variable u_t indicates an i.i.d. process with σ_u^2 variance with 0 average. The variable γ_t indicates the random walk process with 0 average. Because the ϑ_{1t} scalar value and the ϑ_{2t} p dimensioned vector are stable, y_t and x_t are I(1). The deterministic term can be defined in two forms as $d_t = \delta_0 + f_t$ or $d_t = \delta_0 + \delta_1 t + f_t$, according to the fixed term or the fixed term and trending situation. The variable f_t is the Fourier function given in Equation (10):

$$f_t = \alpha_k \sin\left(\frac{2\pi kt}{T}\right) + \beta_k \cos\left(\frac{2\pi kt}{T}\right). \quad (10)$$

The null hypothesis indicating the existence of cointegration and the alternative hypothesis asserting the contrary are indicated in Equation (11) [40]:

$$H_0: \sigma_u^2 = 0 \text{ versus } H_0: \sigma_u^2 > 0. \quad (11)$$

Equations (9) and (10) can be obtained, as in Equation (12), under the existence of the null hypothesis:

$$y_t = \sum \delta_{\mathrm{i}} t^i + \alpha_{\mathrm{k}} \sin\left(\frac{2\pi kt}{T}\right) + \beta_{\mathrm{k}} \cos\left(\frac{2\pi kt}{T}\right) + \\ + X_{\mathrm{t}}'\beta + \vartheta_{1\mathrm{t}}\,. \qquad (12)$$

The partial sum of OLS residues obtained from Equation (12) is calculated as $S_{\mathrm{t}} = \sum_{\mathrm{t}=1}^{\mathrm{T}} \hat{\vartheta}_{1\mathrm{t}}$. From this point of view, FSHIN test statistics are calculated as indicated in Equation (13):

$$CI_{\mathrm{f}}^{\mathrm{m}} = T^{-2}\widehat{\varpi}_1^{-2} \sum_{\mathrm{t}=1}^{\mathrm{T}} S_{\mathrm{t}}{}^2. \qquad (13)$$

However, $\widehat{\varpi}_1^{-2}$ is a consequent long-term variance estimator of ϑ_{1t}, obtained by the non-parametric Barlett-Kernel method.

Data and empirical analysis

The purpose of this study was to analyze the relationship between economic growth and employment through the Fourier approach by also considering the structural breaks. Therefore, we analyzed the unemployment rate (*unrate*) and industrial production index (*indpro*) variables of the United States.

The *indpro* is an economic indicator that measures the real output for all businesses in production, mining, electricity, and gas sectors in the United States. It measures changes occurring in production output and gives information about the structural developments in the economy. Monthly growth in the production index is an indicator of the growth in the industry sector [42]. The employment rate is calculated as the percentage of total labor that the number minus the unemployed represents. Labor data include people aged 16 and over. People in one of the 50 states or in the District of Columbia are included in this data scope, but people working in jails, mental hospitals, elderly-care centers, and the active armed forces are not included [43].

The data cover the period between 01.01.1948 and 01.10.2018 and consist of 850 observations. We obtained data from the database of the Federal Reserve Bank of St. Louis (FRED Economic Data), and we performed analyses using the EViews 9.5 program.

First, we analyzed the stationarity of the variables; *table 1* shows the results.

It is shown that test statistics for the *unrate* and *indpro* variables are larger than table critical values. Therefore, the null hypothesis of the stationarity analysis is rejected. In other words, the *unrate* and *indpro* variables are not stationary. When the stationarity analysis is redone by taking the first differences of these variables, the test statistics are smaller than critical table values. Therefore, the null hypothesis of the stationarity analysis cannot be rejected. In other words, the *unrate* and *indpro* variables are stationary at the I(1) level. Additionally, we tested the trigonometrical terms for both the *dunrate* and the *dindpro* variables for significance, and the trigonometrical terms were significant for both the *dunrate* and *dindpro* variables.

Table 1: Fourier KPSS Stationarity Test Results

Variables	Frequency	Min SSR	Fourier KPSS	Bandwidth	Fstat
Unrate	3,0	1917.71	0.48	23.0	79.35
Indpro	1.0	262923.2	1.32	23.0	802.68
Dunrate	4.0	36.76	0.051	18.0	3.08
Dindpro	3.0	178.39	0.057	18.0	3.18
Notes: Critical values for FKPSS test are 0.1295, 0.1704, and 0.2706 for k = 1; 0.3304, 0.4388, and 0.7086 for k = 3 and 0.3355, 0.4470, and 0.7163 for k = 4 at the 10%, 5%, and 1% levels, respectively. Critical values for the F test used to find the significance of trigonometrical terms are 3.935, 4.651, and 6.281 at the 10%, 5%, and 1% levels, respectively.					

To support the Fourier KPSS type stationarity test, we also performed a Fourier ADF type test [44]. First, in the Fourier ADF test, $k = 2$ and $SSR = 177.13$ for the *indpro* variable. We used the Wald test to test the significance of trigonometric coefficients. The value $Fstat = 0.84$ resulted from this test. This value is compared to the F table value (7.53) in Enders and Lee [44, p. 197]. Because $Fstat < Ftable$, trigonometric terms are significant. Then, in the model where the trigonometric terms are significant, we calculated the t-stat of *indpro* (-1) as 0.25. Because the *indpro* variable contains a trend, we compared it with the t-value in Table 1a in Enders and Lee [44, p.197]. We found 0.25 is less than absolute -4.57, -3.99, and -3.67, which are 1%, 5%, and 10%, respectively. Therefore, the *indpro* has a unit root.

We also performed the Fourier ADF test for the *unrate* variable. For the *unrate* variable, $k = 4$ and $SSR = 36.58$. $Fstat = 1.96$ resulted from this test. This value is comparable to the F table (Table 1b) value (6.16) in Enders and Lee [44, p. 197]. Because $Fstat < Ftable$, trigonometric terms are significant. Then, in the model where trigonometric terms are significant, we calculated the t-stat of *unrate* (-1) as -3.14. We compared it with the t-value in Table 1a in Enders and Lee (2002, p. 197) and found -3.14 is less than absolute -3.62 for 1%. But it is more than absolute -2.97 and -2.66, which are 5% and 10%, respectively.

Therefore, the *unrate* does not contain a unit root with a 5% significance.

When *figure 1* was analyzed, it was revealed that Fourier oscillations, especially for the *unrate* variable, comply with the data. In other words, the *unrate* variable experiences the periodical cycle more than the *indpro* variable in time.

From now on, the FSHIN cointegration test can be performed to analyze the long-term relationship between the *unrate* and *indpro* variables, which were found to be stationary from the same level. *Table 2* displays a cointegration analysis of the relationship between the unemployment rate and the industrial production index for the United States.

Because Fourier Shin statistics are smaller than a 5% critical value for significance level, there is a cointegration (i.e., a long-term relationship), between the USA unemployment rate and the *indpro* variable. These results indicate that sudden structural changes in the *indpro* variable affect the USA unemployment rate in the long term.

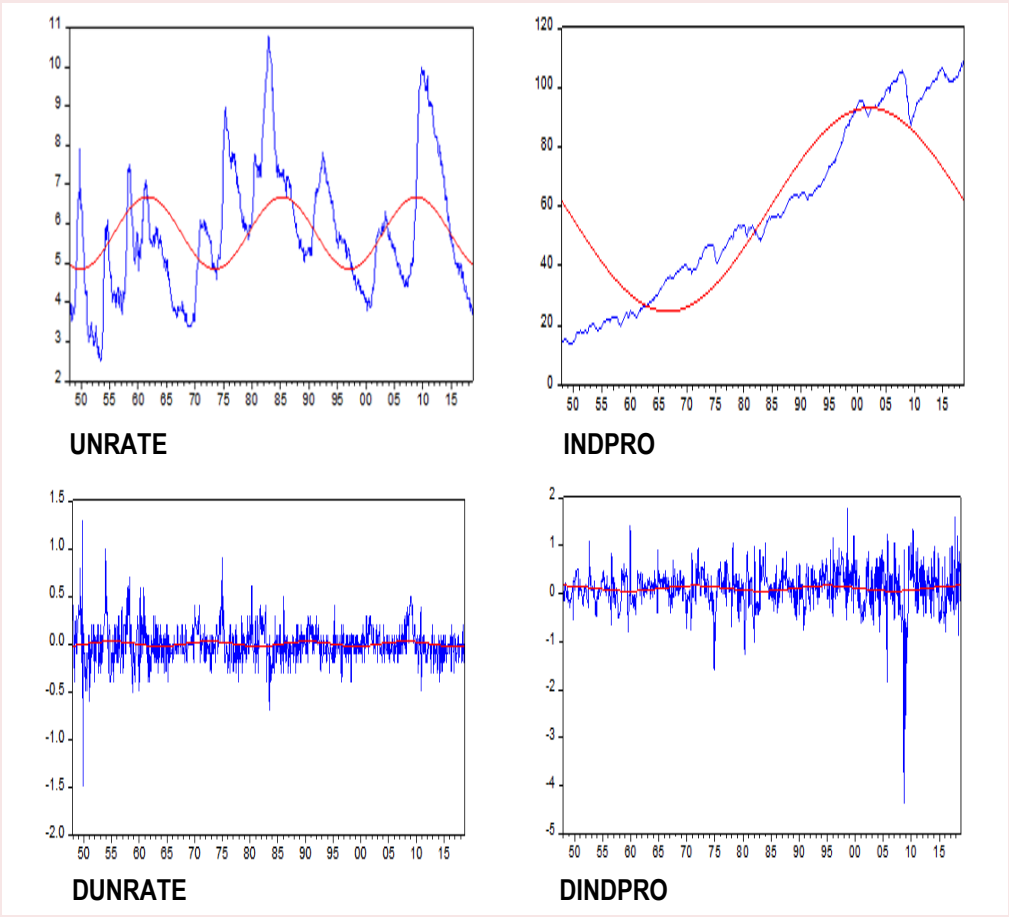
After the cointegration relationship was determined, we estimated cointegration coefficients with the FMOLS estimator developed by Phillips and Hansen [45]. *Table 3* illustrates these results.

We estimated the DOLS estimator and found that it was very close to the FMOLS. According to both FMOLS and DOLS cointegrating results, the *indpro* coefficient is statistically significant. The relationship between the *unrate* and *indpro* variables is inverse. According to this result, because it is an important variable that emphasizes the structural change in production, the increase of the variable will cause the increase in economic growth in the long term, leading to the decrease of unemployment.

To find the coefficients of the relationship between the unemployment rate and the industrial production index by periods, we used the Least Squares with Breaks method, indicating even the break dates, with the Bai-Perron break type. *Table 4* shows the results of this analysis.

1958, 1974, 1990, and 2007 are the break dates in the relationship between the industrial production index and the unemployment rate. According to the findings in the table, the effect of the increase of industrial production on reducing the unemployment in the 1958M08–1974M10 and 1990M11–2007M11 periods is

Figure 1. The Compatibility of the *unrate* and *indpro* Variables and the Fourier Function



Source: Author's own calculation.

Table 2. Fourier SHIN Cointegration Test Results

Frequency	Min SSR	Fourier SHIN Coint.	Bandwidth	F stat
2.0	1754.01	0.21	23.0	2.19
Notes: Critical values for Fourier cointegration test for k = 2 are 0.200, 0.276, and 0.473 at 10%, 5%, and 1% levels, respectively.				

Table 3. Cointegration Coefficient Estimates

Variable	Coefficient	Std. Error	t-stat	Prob.
INDPRO	-0.20	0.02	-9.29	0.000
C	6.53	0.27	23.71	0.000
@TREND	0.02	0.002	9.88	0.000

Table 4. Estimation of Coefficients Through Least Squares with Breaks Method

Period	INDPRO	Const.	t-stat	Prob.
1948M01 - 1958M07	-0.10	6.29	-3.26	0.001
1958M08 - 1974M10	-0.05	6.86	-6.03	0.000
1974M11 - 1990M10	-0.14	15.02	-13.16	0.000
1990M11 - 2007M11	-0.05	10.28	-11.14	0.000
2007M12 - 2018M10	-0.31	38.67	-19.65	0.000
Notes: R^2 = 0.66, Prob. (Fstat = 0.000) and Breaks were obtained as 1958M08, 1974M11, 1990M11, and 2007M12.				

quite weak. One of the most striking points in the coefficients is that the effect of the increase in the industrial production index on reducing unemployment was at its highest value in the 2007M12–2018M10 period. Expansionary monetary policy, implemented in the specified period in the United States, may have affected that situation.

Conclusions

In this study, in the light of the existence of structural breaks, we investigated the long-term relationship between economic growth and employment in the United States. We selected the determination of economic growth, the industrial production index, and the indicator of employment, the unemployment rate, and tested the long-term relationship between specified variables using data of 850 months between January 1948 and October 2018. We analyzed the stationarity of used time series through the Fourier KPSS stationarity test considering structural breaks, and it was not found to be stationary at the level in either series. The series were characterized as stationary at I (1). We used the Fourier Shin cointegration analysis to investigate the long-term relationship between variables. According to the cointegration analysis results, we found a long-term relationship between the U.S. unemployment rate and the industrial production index variables. These results indicate that sudden structural changes in the industrial production index have an effect on the USA unemployment rate in the long term. These results are compatible with ones presented in the economic literature, where it is indicated that unemployment will increase in cyclical contraction periods; however, unemployment will decrease in cyclical expansion periods.

After determining the long-term relationship between these two variables, we estimated coefficients through the Least Squares with Breaks method, thereby determining break periods and coefficients belonging to these periods. The years of structural changes were 1958, 1974, 1990, and 2007.

As Meltzer stated in 1991 [46], the breakpoint of 1958 could be considered the result of the continuous decline of the dollar's real exchange rate index and development of international relative prices in relation to the United States, along with the currency convertibility of the Bretton–Woods system. The break of 1974 may be related to the start of an adjustment mechanism period in the United States, along with the collapse of the Bretton–Woods system in 1973 and the transition to a floating exchange rate regime [47].

These results also indicate that unemployment will decrease along with increases of production in periods when expansionary economic policies are implemented. During the analysis of coefficients, related to break dates, especially for 2008 and 2018, it was revealed that the increase of industrial production reduced unemployment in this case more than in other periods. Fawley and Neely suggested [48] that this result could be related to the "Quantitative Easing" policy of FED, which started in November 2008. The expansionary monetary policy, which resulted from this FED policy, led to the stability of growth rates in the United States and reduced unemployment markedly.

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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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