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Visual Experiment Results (About the 2021 Nobel Prize in Economic Sciences)

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ABSTRACT

The article is devoted to analysing the achievements of the laureates of the Nobel Prize in Economic Sciences in 2021. The author described the methods of natural experiment used by the laureates in their research. Further, the author noted the differences between different types of experiments: laboratory, field, computer and mental (thought, imaginary). The author described details of two of their studies (which have become classic) on the consequences for the labour market of the influx of immigrants and the increase in the minimum wage. The methods and results of the laureates' research on assessing the consequences of state programs and structural decisions are also analysed. In conclusion, the author considered new experimental and econometric research methods, which the laureates have significantly improved. In particular, it concerns the method of counter samples and an example from the author's research using this method.

Keywords: natural experiment; randomisation; labour market; minimal wages; labour immigrants

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INTRODUCTION

Three professors from the United States received the Nobel Prize for Economics in 2021, each of whom relates to another country. This peculiarity of American awards is not unique to economists. Nobel Prizes in Physics, Chemistry and Medicine are very often awarded to scientists who have come to the country, and the United States should be proud to be able to attract talented people from around the world.[1]

David Card was born in Canada, where he received his first higher education and still retains Canadian citizenship. After receiving his bachelor's degree, he studied and worked in the United States. He graduated from Princeton University and received a PhD in the University of Chicago in 1983. After becoming a doctor, he returned as a teacher to Princeton University. He received the title of professor in 1987, and since 1997, he has been teaching at the University of California (Berkeley). In 1995, David Card was awarded the prestigious John Bates Clark medal.

Joshua David Angrist has two nationalities — the United States and Israel, although he lived in Israel for only three years, and was born in the United States and worked there most of his life. In 1982, he graduated from private Oberlin College in Ohio. After receiving his bachelor's degree, Angrist left for Israel and returned to the United States only in 1985. He entered at Princeton University, where he received his PhD in 1989 and then — an assistant professor at Harvard University. In 1991, the scientist again leaves for Israel, where he teaches at the Hebrew University in Jerusalem as an associate professor. Since 1996 J. Angrist works at the Massachusetts Institute of Technology (MIT), where he was appointed professor of economics in 1998 and has been teaching at the Department named Ford ever since.

Like other 2021 laureates, J. Angrist is actively collaborating with the US National Bureau of Economic Research (NBER) and with the German Institute for Labor Economics Research (IZA).

Guido Imbens of Stanford University was born and educated in Holland. After moving to the United States, he first taught at Harvard and two California universities (Berkeley and Los Angeles) before joining to Stanford University. He was admitted to the Royal Netherlands Academy of Sciences and Arts as a foreign scholar.

Guido Imbens is considered a representative of econometrics not only because of many of his publications, but also because he has been working as a magazine editor "Econometrica" since 2019.

All three laureates worked on a similar topic and have many joint publications.

EXPERIMENT SPENT AND SEEN

Thanks to the 2021 Award, the term "natural experiment" has gone beyond the narrow circle of specialists. In domestic tradition, it is contrasted with the laboratory experiment, whereas in English-language scientific literature it is compared with the field experiment and is opposed to the laboratory. The term "естественный эксперимент" in Russian is translated both as a "field experiment" and as a "natural experiment". The field experiment has all the properties of the ordinary experiment: there is its plan, along with the experimental object pre-selected control, etc. In contrast to the laboratory, in a field experiment, the researcher deals with real companies, with actual existing market players. The laboratory is applied to a certain group of people (for example, students) and creates situations in which the subjects find themselves, mostly fictional or game.

The reason for the absence in Russia of a difference between natural and field experiments seems to be hidden in the low development of cooperation between

[1] URL: www.forumdaily.com/gordost-ssha-nobelevskie-premii-vse-chashhe-zavoevyvayut-immigranty/

science and the authorities in relation to the economic experiments and reforms being carried out in our country.

The natural experiment does not plan, but rather marks out any differences between the situations in which the subjects are found. It is not easy to find a good real situation that can be classified as a natural experiment (for example, a disaster that has affected some actors and not others). It is somewhat more difficult to include in the category of natural experiments a situation where different objects have different backgrounds. The difficulty is that there are many factors intertwined in the history of the experiment that, in one way or another, are related to the variables studied in the experiment.

Applied to medicine, the natural experiment is opposed to clinical trials that are closer to experiments, conducted in the field of physics, the fact that the researcher has full control over the subject (or experimental group) and the conditions in which they are located. The field experiment, whether carried out by doctors or economists, involves only those who have agreed to participate. In this case, it is more difficult to distinguish causal relationships from the many relationships between parameters that have been identified.

If distract the view from economics, natural experiments are the basis of any scientific discovery (for example, no one picked the apple hanging over Newton — the experiment was natural). If nature had not conducted a natural carbon experiment in very early times, creating conditions in the form of high pressure and temperature, people would never have thought of how to get artificial diamonds.

Here are some examples of natural experiments that have led to discoveries that have changed the world. So, without the natural experiment with the Petri dish, which Alexander Fleming did not wash, penicillin would not have appeared. If not for the cathode-ray tube a piece of cardboard with the remains of barium salts, which glowed in the dark, Wilhelm Röntgen would not have laid the foundation for one of the most common diagnostic devices. If Konstantin Falberg, a Russian citizen, had not once forgotten to wash his hands, there would have been no traces of coal tar on the piece of bread he had bitten off and no saccharin would have appeared. If Oscar Minkowski and Joseph von Mering had not noticed the flies flying on a puddle of test dog urine, there would not have been any insulin. If Charles Goodyear had not inadvertently dropped a lump of rubber mixed with sulfur on a hot stove, there would have been no car tires. What about car glass? Would it have been if Edward Benedictus had not dropped an empty glass flask on the floor in 1903, which had not broken because a thin layer of collodion solution remained on its inner walls?

Sometimes such discoveries are a simple accident. But more — is the merit of the researcher: only his attention, observation, curiosity and a clear overview of the result allow you to notice the deviation, see the unusual.[2]

In addition to comparing the natural experiment with the field and laboratory, it is useful to consider computer (computational) and thought experiments.

In the Feynman Lectures on Physics [1] (which, according to the author of the article, every economist should skim read) the acceleration of free fall is described as follows. If you throw down two identical bricks, they will reach the ground at the same time, because they are the same and they are flying with the same acceleration. Then we combine these two bricks with a weightless chain — the result is the same.

[2] There is a special term "serendipity", which has not yet taken hold in the Russian language even among historians of science. It refers to the "ability to make deep conclusions from random observations", "to find what I did not seek intentionally", "special ability to make random inventions", etc.

In addition, even if the length of the chain is shortened to zero, "double" brick flies to the ground in the same time as the usual. The presence of a single object for all falling to the ground of the acceleration of free fall is proved by thought experiment, not real.

In the natural experiment, there is the effect of some external influence of artificial (virtual) separation of the studied groups to the one that was exposed and the one that this effect has avoided. [2]

In reviewing with the research of the laureates will have to address on another term, the meaning of which does not fit into the Russian system of terms, — "treatment". Usually it translates as "treatment", but in the context of natural experiments, its meaning is much broader. It refers to any impact, most often with good intentions, although the latter is not necessary. In one of the articles, G. Imbens gives examples of treatments: employment assistance programmers, educational programmers, vouchers, normative or regulatory acts, new technologies or medicines, environmental impact, etc. [3]

As a synonym of the term "treatment" sometimes use "intervention".

PREDECESSORS

The laureates themselves refer to Trygve Haavelmo as their predecessor,[3] who wrote back in 1944 about the "flow of experiments that Nature repeats constantly in its huge laboratory". [4] Moreover of this phrase about the possibility of using natural experiments in economic research, T. Haavelmo has nothing on this issue.

Most significantly, the predecessor of scientists the Nobel laureate in economics 2002 can be considered Vernon Smith, who laid the foundations for an experimental direction in economic research. Smith based much of the new science on laboratory experiments, although he was the one who started the field experiments. He conducted them, investigating the reaction of consumers to the level of electricity tariffs, as well as the introduction of a two-rate tariff: reduced at night and increased during the day. His practical experiments revealed, for example, the level of difference in day and night tariff where housemaker include washing machines primarily at reduced rates.

In 2019, Esther Duflot, Abhijit Banerjee and Michael Kremer won the Nobel Prize for Economics. Their research focused on the problem of poverty and finding ways to reduce it in the world. The theme is far from what the 2021 prize winners did, but the methods they used are very similar — the same randomized field experiments, similar to natural.

While in 2019, the focus of people's attention was on the problem, which they tried to solve with their research, then in 2021, came to the first place is the methods of research. There were a lot of people around me who were disappointed on the criteria by which Nobel Prize winners in economics were now selected. "There is no such level", — they complain, — like the first winners, like Jan Tinbergen or Friedrich von Hayek. Those had the swing, the flight of thought! Routine has replaced the perspective. Is it possible to compare them with modern laureates who only solve practical problems, help people overcome everyday difficulties?"

The same practical orientation should you have in mind when looking at the results of the laureates' studies in the field of labour economics. This purely economic theme is more akin to operational intervention in medicine and psychology than to theoretical research in the same field. It is no coincidence that in his Nobel lecture, David Card repeatedly mentioned the author of the theory of human capital, Harry Becker, whose research in education

[3] Trygve Magnus Haavelmo (1911–1999) was a prominent Norwegian economist, professor at the University of Oslo, and Nobel Prize winner in economics in 1989.

actually paved the way for the methods and objectives of the 2021 laureates' research.

LABOR MARKET — NOT EXACTLY THE MARKET

Before the work of the laureates, most economists took for granted that the labor market is similar to the goods and services markets. Researchers did not notice any particular differences between them. The labour market was considered competitive, regulated by demand and supply.

This myth was formed of some misconceptions, in particular, that if the salary is low, then a person can easily move to another firm where pay more. Companies focus on established pay levels and employ employees based on this level and what the company's income allows.

The research of the laureates showed that finding a new job and replacing the existing one — is a costly and long process. The labour market is more dominated by large firms than the goods and services markets and cartels (primarily wage levels) are used. But perhaps the most important difference is that there is not an abstract faceless labour force, and everyone who offers their work has their own idea of what is more suitable.

In addition, unlike the product or service market, multiple layers characterize the labour market, i.e. workers with the same qualifications may receive substantially different wages.

The income gap in the developed world decreased in the 1970s and increased since the mid-1980s, but this was not a return to past stratification. It has become more dependent on the organization or company in which man works and has been linked to the general trend of companies coexisting with low and high wages.

Companies that (for many reasons) can afford to pay high wages to their employees are fundamentally different from those with weaker financial positions. [5] This stratification of the labour market by the level of solidity of companies is gradually shifting to the markets of goods and services. Has already become an ordinary difference in the retail price of the same product in a respectable supermarket with a huge parking space and in the discount, where buyers come by public transport. Some stores attract buyers with low prices, others — with declarations of high quality.

Interestingly, this process is not taken into account by those, who study price movements or make inflation forecasts, that the food market is united, and can be measured the movement of a single commodity price by tradition.

However, even more surprisingly, such a long-established stratification of the labor market only noticed the penetration. And the two issues which will be discussed further, about next are that the 2021 prize winners originally saw the labor market as different than most of their predecessors. [6]

IMMIGRANT TO THE LABOUR MARKET

Standard comparisons between immigrants and local employees are usually limited to comparing their current earnings, as well as the extent to which migrants displace "their" in the labor market.

The 2021 laureates have given special attention to those immigrants who arrive in the country already having a higher education (at least a bachelor's degree). Earnings for this group grew at a rate 20% higher than that of local employees, and increased significantly when moving to higher-paying jobs in another company. [7] At the same time, all of them received additional training at the workplace and upgraded their skills at the expense of the employer. [8]

Despite the fact that the educational qualifications of immigrants are not taken into account, but are gradually assessed by employers their competence, ability to work and diligence. Then this assessment is transferred to their documents, which are

becoming highly appreciated in the labor market. [9]

The growing symbiosis between newcomers and local employees is redefining the problem of migrant workers, — take into account the interests of all parties involved: employees from local communities, employers, the State and migrants themselves becoming part of society. This fact drew the attention of D. Card, in particular, because his first research was devoted to immigrants from Cuba in Miami, and need to be sure, that immigrants feel better in their new homeland than in the revolutionary Cuba. Of course, each country will have its own approach to the balance of interests, but the principle of achieving it remains the same. [10]

As a result, the laureates' research on the consequences of labour immigration a new section of economic science "The economics of immigration" was formed [11], and courses have been developed and taught on this subject.[4]

MINIMUM WAGE

The second direction of research in the labour market, which served as the basis for the winners of the award, concerned the local minimum wage increase. The reason for the researchers' interest in this topic is understand. Introduction or increase of the minimum wage (MW),[5] as a rule, are associated with many undesirable consequences: rising unemployment, worsening business conditions by increasing the tax burden on employers and then restraining wage growth for the most productive employees. The list of possible negative consequences of increasing MW can be continued, but behind all of them, there is a general rejection of business of any government intervention in its activities, ignoring the interests of economic participants. If an employee only works low wages, why should an entrepreneur pay more? It is like prevent dismissals — as a measure introduced from time to time in different countries during the crisis years.

Since the division of economic science into macroeconomics and microeconomics, economic subjects have been gradually disappearing in many economists' studies. In addition, the decisions made by the authorities were presented as automatically enforceable. It is enough to take a decision on increasing tax rates when the budget starts to receive additional income. But in reality, it turns out that higher tax rates reduce tax collection, and budget revenues do not increase, but decrease.

For example, it was decided to increase the average salary of scientists in Russia, that at previous levels of funding, the actual goal is to reduce the number of researchers, to get rid of ballast, from staff not appropriate the requirements. In fact, this has resulted in some researchers being paid part-time or quarter-time while maintaining their actual monthly payments. Rates were reduced and staffing levels maintained. This decision was not considered the position of the heads institutions who regarded the reduction in the number of staff as a reduction in activities.[6]

Abroad, increases in the minimum wage were associated with the threat of unemployment. In Russia, this measure, borrowed from foreign practice, was often interpreted as one of the state's concerns for the poor. For this reason we get acquainted with the research of the laureates not only with an interest in the experiments as such, but also with a new perception for us — fear of rising unemployment. Research of the 2021 laureates showed that, by all means, companies avoid reductions, and the number

[4] Introduction to Immigration Economics. URL: https://courses.lumenlearning.com/boundless-economics/chapter/ introduction-to-immigration-economics/

[5] The abbreviations and the formulation of the term are purely Russian.

[6] These problems are partly peculiar to Russia and other countries where monthly wages are calculated and have been simplified for those countries where hourly rates are set.

of employees after the increase of the minimum wage (hourly) is not reduced. [12]

However, the most famous of their studies concerned a rather narrow group of employees of the restaurant business. It was a natural experiment to raise the minimum wage in this field in one of the bordering states. In the early 1990s, the minimum hourly wage in New Jersey was raised from 4.25 to 5.05 US$, and the neighboring state of Pennsylvania did not have that kind of increase.

According to the statements of a number of experts, the winners "dropped all charges" from the minimum wage. An interesting development of the laureates' work is the simultaneous study of the impact of the increased minimum wage and the flow of immigrants, which was carried out in a method other than that used by the laureates. [13] The new methodology examined the entry of migrants into specific groups of employees with the same level of skills as migrants. It was found that with the arrival of migrants, wages for local workers fall, but if a decision to increase the minimum wage is taken at the same time, this does not happen.

According to the plans of the Government of the Russian Federation MW in Russia in 2022 will exceed 13.6 thous. rubles. International economic organizations, in particular the International Monetary Fund and the Organization for Economic Cooperation and Development, approve such increases in the minimum wage.

EVALUATION OF PUBLIC DECISIONS, PLANS AND PROGRAMMERS

One of the issue to which life itself leads,— is an assessment of the impact of particularly interesting public decisions when they are combined into some concept, strategy or programme.

Usually, this assessment is divided into parts, each of which determines the impact of the government decision on individual categories of economic agents: households, enterprises, individuals, regions or municipalities. First, the reactions to the decision of the subjects of each category are described, and then the combinations of these reactions are examined.

The fundamental advantage of J. Angrist and G. Imbens' research, that they had proposed a method for the identification of cause-effect relationships based on natural experiments in 1994. Without this, it would be difficult for them to raise the very important issue of assessing the impact of integrated government decisions on plans and programmes.

Thus, the so-called "internal causation mechanism" is formed, which can be verified by case-studies and natural experiments. [14] Better to check the effectiveness of such a mechanism is to first formulate a question that requires an unequivocal answer. For example: "Does the flow of migrants lead to higher unemployment? Yes or no". [3] Or: "Will I earn more, if I get a master's degree?"

However, such questions do not take into account that the implications of any management decision are heterogeneous and uneven. And the answer to a one question doesn't describe the full range of these consequences. But this problem was left to the laureates for further research.

NEW RESEARCH METHODS

Many innovations made by the laureates in the methods of building experimental and control groups. Stay on one of these methods.

Counter-sample is the method by which objects are selected from the population (or respondents), similar to each other as is possible for all indicators except one, which is the experimental variable. The pairwise samples reproduce, in a certain way, the general pattern of the labour market, which consists of meetings between employees and employers. G. Imbens used counter-sampling in different areas: comparing winners and losers in the lottery, the effectiveness of support measures in the search for work,

and various training programs. [15] In another research, the pairs of test subjects were pregnant women who were similar to each other as is possible in all but one. One woman in a couple took barbiturates during pregnancy and the other did not. The psychological condition of each of them after childbirth was examined, and the psychology of the children born. [16]

I will explain the idea of "matched sampling" using the example of one of my own studies related to the 1990s. It is useful to understand that the methods of the laureates are quite suitable for use in Russian conditions. [17]

In a natural experiment, named "privatization of pharmacies", were built pairs of pharmacies in Novosibirsk. One of the pharmacies in the pair was municipal, the other — was private, and they had to be no more than 150 meters from each other. Such pairs in Novosibirsk turned out to be 20. When comparing the prices of medicines in commercial and municipal pharmacies in actual prices (i.e. without sale, discount cards, etc.), the first clearly lose: the price of medicines in commercial pharmacies is generally higher than in municipal pharmacies.

Conclusion: if the municipal pharmacy in each pair became private, it would reduce the assortment by 20% and prices increased by 11.5%.[7] The greatest price discrepancies between municipal and private pharmacies are due to the more intense traffic in municipal pharmacies.

I think we can do many such natural experiments for a variety of practical purposes.[8]

Although the Nobel Committee's formulation made no mention of the laureates' achievements in econometrics, none of their achievements could have been achieved without the development of econometric models. So, J. Angrist (author of the now well-known two-step method of least squares, as well as its own statistical criterion that superseded the Wald criterion, according to which the optimal of many solutions will be what provides the best outcome in the worst of circumstances) with Donald Rubin[9] wrote an econometrics study book, which sets out a broader view of this science than before. [18] This research would have been worthy of the attention of the Nobel Committee. Even some of it may well be recommended for study. [19]

Another innovation introduced in econometrics by J. Angrist and G. Imbens concerns quantum regressions. Many analysts consider statistical dependencies by mean values, sometimes reconciling calculations by replacing mean values with median values. Only in 2021, the Nobel Prize winners paid attention to the fact that the median — is only a private case of quantile.[10] Quantum regressions were invented long ago [20], but before the laureates, they were used solely to predict stock decline, that were resume on reaching set minimum. In the work of the laureates, quantum regressions have been incorporated into the general system of regression analysis of many economic phenomena and processes.

The first volume of the econometric forecasting handbook was published in 2006. It reviewed the sharing of several forecasting techniques in one study. [15] The most intensive joint application of several methods was used in macroeconomic

[7] As the study was commissioned by a firm intending to privatize pharmacies, it refused to pay for such findings.

[8] Although both experiments were clearly similar to the natural experiments of the laureates, at that time it was necessary to use the revolutions of "virtual" and even "mental" experiment, which is incorrect.

[9] Donald Bruce Rubin — emeritus professor at Harvard University, also teaching at Temple University (Philadelphia) and at Xinhua University in China.

[10] Median value of a variable — distribution of a random value in half. There are also quartiles (lower and upper) that divide the distribution in proportion three to one, deciles that separate 10% of the distribution and even the percentage that separates 1% of the distribution on the right (upper percentile) and the left (lower percentile).

models for forecasting GDP. J. Angrist could not get past these studies and conducted pilot tests of the effectiveness of joint and separate projection methods for forecasting GDP. [21]

Stanford University young professionals group led by J. Angrist used three statistical methods of projection, first independently and then jointly on the material one set of multi-year data from different time periods (from 10 to 270 quarters). It has been shown that joint use of techniques gives better results, especially if models have lags. The proposed methodology gives each of the methods what they deserve. If a method giving bad results, its share in the total (joint) forecast automatically decreases. Such a technique was called cross validation by the researchers.

Experimental evaluation in economists do not meet as often. Observing current events and processes more usual,— mainly econometrics works precisely on the results of monitoring. Its background reflects the natural course of events, without suspicions of any interference in the process.

Of all the dependencies between parameters (even when these dependencies are very high) need to highlight those whose changes are the reasons for the change of other parameters. Nobel Prize winners already included those who received the causality analysis award — it is Nobel Prize winners in economics 2003, Robert Angle and Clive Granger ("causation by Granger"). Laureate's winners have developed this approach in two directions in 2021.

The first of these — is experimental. Unlike passive researches, which do not divide objects into experimental and control groups, when randomizing an experiment, it is necessary to ensure that objects are randomly selected for both groups, and there were no significant differences that do not include in the experiment. Explaining the last thought, D. Card gives example from research he criticized. In the experiment, the control group is represented by people who have been treated at the clinic, and the control sample — is represented by those who have not been treated. As a result, it was concluded that the health of those treated was worse than the average of surveyed. But the conclusion is incorrect: those who were treated initially had worse health than the average person (otherwise they would not have gone for treatment). It is more correct to recruit a control group of those who had the same disease, but have not been treated. He borrowed this example from Donald Rubin, who proposed a special method of constructing a control group in which such cases would be excluded.[16]

The second direction — econometric, through the introduction to the equations of so-called instrumental variables. They are embedded in the so-called cause-effect model of the same D. Rubin. [22] The line of these causality researches begins with Jerzy Neumann's dissertation (1923). [23] But J. Neumann considered only fully randomized experiments, and D. Rubin extended his approach to both observations and partially randomized experiments. [24] D. Rubin subsequently used this method to form pairwise samples in a natural experiment. [17] G. Imbens, in his Nobel lecture, mentioned another predecessor of the laureate — F. G. Wright,[11] who first and for a very long time used the tool variable method and was the first to put the problem of identification.

To determine import duties on animal and vegetable oils and fats, F. Wright needed to know the elasticity of demand for these products. Since the least squares method gave biased estimates, he suggested introducing another variable that would affect price but would not be related (by definition) to demand. As such, he took

[11] Philip Green Wright (1861–1934) was a professor at Harvard University and a member of the United States Tariff Commission. The problem of identification in econometrics first raised in 1915, and in 1928 proposed the method of instrumental variables.

the amount of Z rainfall that occurred in the season prior to the establishment of duties. [25] By analogy with this first application, additional variables (instrumental) have been introduced into econometric equation systems for almost a century.

CONCLUSION

The Nobel Prize for Economic Research represents three trends in 2021. The first is the increasing importance attached to the practical application of research and its usefulness. The second — is that the experimental direction in economic science is becoming less exotic and more common. With regard to the third, the laureates have shown themselves as integrators, combining the results obtained in microeconomics with econometrics. The future — similar integrating interdisciplinary research.

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On Achieving Strategic Goals and Ensuring the Security of Modern Russia*

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ABSTRACT

The strategic objectives of the subject (a person, a group of individuals, an estate, a class, a nation, a community, a state, groups of states, a society) are determined mainly by the conditions in which the subject is located. It includes its specifications (including traditions, worldview, level of development, and available knowledge) by its capabilities and opportunities. Changing even one of the listed factors can cause a change in goals. The paper presents the results of a study of the movement towards achieving vital goals that society sets for the long term: society's strategic goals. The goal in this paper is understood as a specific image (representation) of the result formed by society, which it strives to achieve. The author assessed the speed and nature of the movement towards achieving the constituent components of the strategic goals of the Russian Federation — preserving the nation and increasing the economic power of the country. Statistical data of the World Bank and the Federal State Statistics Service of the Russian Federation from 1992 to 2020 served as initial information for calculations. The calculations performed showed that the movement towards achieving the set goals was of an oscillatory nature, and the amplitude of fluctuations in time tended to decrease. The latter indicates a slowdown in the speed of approaching the set goals.

***Keywords**:* strategic goal; Russian Federation; population; economic growth; security

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"High goals, even if unfulfilled, are dearer to us than low goals, even if achieved"

Johann Wolfgang von Goethe

INTRODUCTION

The goal of human society is some form of image (representation) of the result to which a given society aspires.[1] Long-term goals important for society are called national or strategic. The content of the term "national" is ambiguous (and not only in Russian). Thus, Ozhegov's dictionary gives four definitions of the content of the word "national". Three of them relate it to the nation and nationality: 1) "in accordance with the social and political life of nations, related with their interests"; 2) "membership, characteristic of the particular nation, expressing its character"; 3) "belonging to a small separate national". And in a one "national" is identified with the state: "the same as the state" [1, p. 350].

American dictionary "Webster's new collegiate dictionary" gives five definitions of adjective "national": "1: of or relating to a nation, 2: nationalist, 3: comprising or characteristic of a nationality, 4: belonging to or maintained by the federal government, 5: of, relating to, or being a coalition government formed by most or all major political parties".[2]

In our economic literature, the word "national" was used mainly in the phrase "national income" until 1991. Given this, the author believes that the notion "strategic goals of society" is more accurate than "national goals".

The goal is the mental expression of necessity, generated by reality. Failure to achieve the necessary (lack of necessary) for society threatens the development of society. Therefore, the degree of achievement of the goal(s) can be used as an indicator of safety. Erroneous goals are also dangerous, because the idea of what is needed may not coincide (not completely coincide) with what is really necessary.

Currently, strategic goals, common to many countries of the world, are the following: preservation of the population, protection of the territory of their residence, secure the sovereignty of the country, increase the welfare of the people, protection from external hostilities, ensuring environmental safety, preserving and improving the country's position in the world. Failure to achieve these goals threatens the security of society, its members and institutions.

Below are presented the following results of the study of the Russian Federation's progress towards the three strategic objectives: increase the population, increase the level of welfare of the Russians and the entry of Russia in the ranks of advanced economic powers.

POPULATION

The speech of the President of Russia V. V. Putin to the Federal Assembly of the Russian Federation in 2020 spoken: "The fate of Russia, its historical perspective, depends on how many of us... how many children will be born in Russian families in a year, in five, ten years, how they will grow up, what they will do for the development of the country and what values will support them in life".[3] Demographic growth — a very pressing and important task.[4] [2]. If there is no population, there is no society, no country, no state.

And it is no coincidence that the preservation of the population, the health and welfare of the people is the first goal in the list of the main development goals of the Russian Federation for the period up to 2030, specified in the Decree of the President of the Russian

[1] "A goal — is an expected result of some actions, corresponding to the basic interests of a aspirant". URL: https://aftershock.news/?q=node/378579&full

[2] Webster's New Collegiate Dictionary. 150th Anniversary Edition; 1981. 1532 p.

[3] URL: http://www.kremlin.ru/events/president/news/62582

[4] B 2006 r. A. I. Solzhenitsyn wrote: "Preserving of the people — both in their numbers and in their physical and mental health — is the highest of all our public tasks".

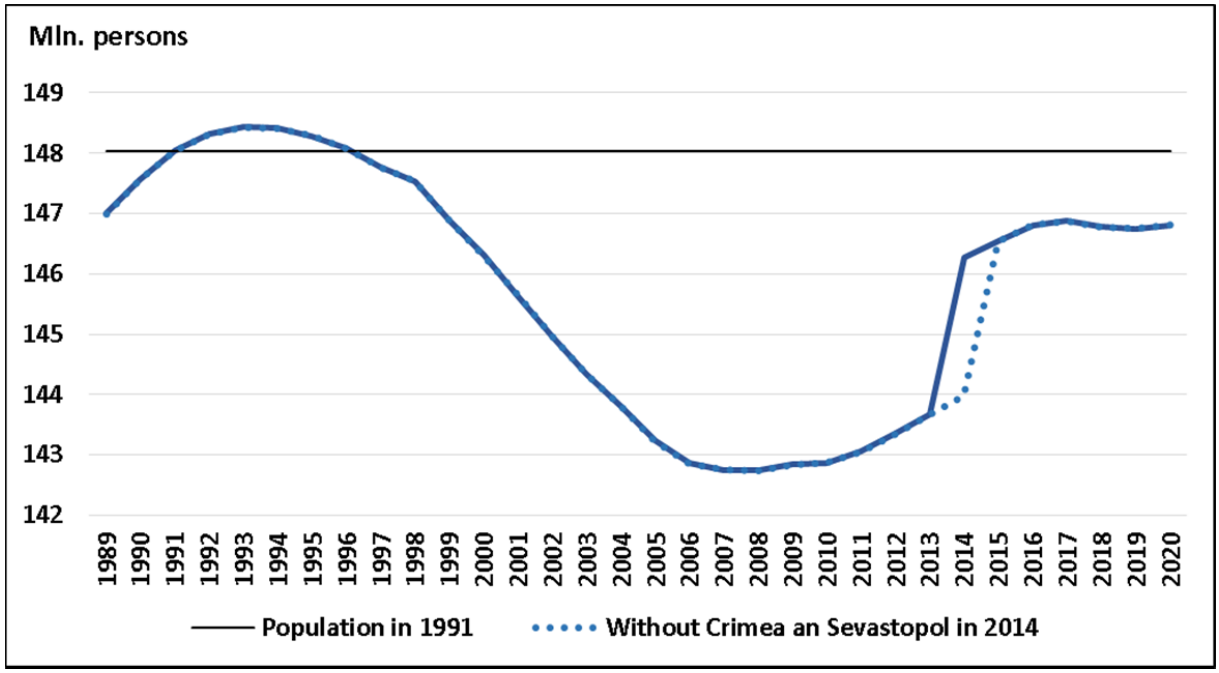

Fig. 1. **Dynamics of the population of the Russian Federation in 1989–2020, millions of people**

Source: compiled by the author based on the date of the World Bank), of the website "The population of the countries of the world in 1980–2020", and on the data of the Unified plan for achieving the national development goals of the Russian Federation for the period up to 2024 and the planning period up to 2030.

Federation from 21 July 2020 No. 474 "The Russian Federation's National Development Goals for the period until 2030".[5] Within the framework of this goals, the Decree prescribes the sustainable growth of the population of the Russian Federation, which has been declining in recent years.

The first wave of depopulation in modern Russia lasted 15 years — from 1994 to 2008 inclusive[6] (*fig. 1*). The increase in the number of Russians in 2009–2017 was due to the relatively favorable age structure of the citizens of the Russian Federation, improving living standards, the social and demographic policy implemented in the country. The population growth of the Russian Federation in 2014 (2.6 mln persons) was largely due to the accession to Russia of the Republic of Crimea (1.896 mln persons) and Sevastopol (399 thous. persons). If not included in the calculation, the population growth of the Russian Federation in 2014 amounted to 305 thous. persons.

In 2018 began the second depopulation wave. At the reproductive age came born in the first wave of depopulation in post-Soviet Russia. The decline in the number of women of reproductive age (possibly with worse health than before the 1990s), under otherwise equal conditions, leads to a decrease in the number of births, and the increase in the number of people over 70 years of age — the increase in mortality. It is therefore no coincidence that the Unified plan achieving the national development goals of the Russian Federation for the period up to 2024 and for the period

[5] URL: https://rg.ru/2020/07/22/ukaz-dok.html

[6] Demographers note that "the population of Russia has ceased to reproduce itself for 1964–1965. And with the urban population this happened much earlier, and the rural population for almost thirty years, until 1992 inclusive, had an extended reproduction. Falling below the threshold, fertility determined the beginning of the phase of latent depopulation. However, due to the accumulated potential of the demographic structure, natural growth remained positive for many years and the population continued to grow by inertia" [3, p. 752].

Table 1

Reduction of the population of the Russian Federation in 2021–2024 in the materials of the Unified plan for achieving the national development goals of the Russian Federation for the period up to 2024 and the planning period up to 2030 and in the Forecast of socio-economic development of the Russian Federation for 2022 and the planning period of 2023 and 2024, thousands of people

Source/Year	2021	2022	2023	2024
Unified plan	–536	–533	–303	–257
Forecast 2022–2024	–600	–500	–400	–300

Source: compiled by the author based on the date of the World Bank), of the website "The population of the countries of the world in 1980–2020", and on the data of the Unified plan for achieving the national development goals of the Russian Federation for the period up to 2024 and the planning period up to 2030.

up to 2030,[7] developed for the implementation of the Decree of the President of the Russian Federation from 21 July, 2020 No. 474 "The Russian Federation's National Development Goals for the period until 2030", expected the population of the Russian Federation to increase in 2022. However, less than a year later (September 2021) the Forecast of socio-economic development of the Russian Federation for 2022 and for the plan period 2023 and 2024 (Forecast 2022–2024) gave even more depressing numbers (*table 1*).

"Due to objective demographic trends,— noted in the Unified plan achieving the national development goals of the Russian Federation for the period up to 2024 and for the period up to 2030,— the population of the Russian Federation will decline in the next few years". The average annual reduction in the population of the Russian Federation in 2021–2024 (–407.0 thou. persons) indicated in the Unified Plan was significantly higher than that recorded by the World Bank in 1994–2008 (–379,6 thou. persons).[8] "It's very strange to die out on your land in peacetime, having the world's largest territory and huge resources for life" [3, p. 758].

It is understandable that the decline in the number of inhabitants threatens the security of any country, especially those with low population density. The latter traditionally includes Russia, which rich in natural resources, water and forests. In terms of security, the situation of our country is complicated by the growth of population in neighboring countries (including Muslim religion) and in the USA (which is a strategic competitor) (*table 2*), and also because of the active work of the Republic of Turkey under President Recep Tayyip Erdoğan to unify the Turkic peoples with the aim of reconstructing the Ottoman Empire [4], including the neighboring States with the Russian Federation.

An idea of the success of this work may be illustrated from the example of cooperation between the Republic of Turkey and the Republic of Azerbaijan in the political, economic, military, scientific and technological, information and ideological fields and in the field of education from treaties concluded by these countries in recent years, joint memorandums, signed protocols.[9]

[7] Approved by the Decree of the Government of the Russian Federation from 01 October 2020 No. 2765-p.

[8] URL: https://www.economy.gov.ru/material/dokumenty/edinyy_plan_po_dostizheniyu_nacionalnyh _celey_razvitiya_rossiyskoy_federacii_na_period_do_2024_goda_i_na_planovyy_period_do_2030_goda.html

[9] Shusha Declaration on allied relations between the Republic of Azerbaijan and the Republic of Turkey, 2021 r. URL: https://news.day.az/officialchronicle/1352978.html; Political relations between Turkey and Azerbaijan. Economics essay. URL: https://www.uniassignment.com/essay-samples/economics/political-relations-between-turkey-and-azarbaijan-economics-essay.php

Table 2

Increase (+) / decrease (–) in the population of nine countries in 1993–2020, million persons

Country	Population growth	Country	Population decline
USA	76,694	Republic of Estonia	–0,232
Republic of Turkey	27,717	Republic of Armenia	–0,542
Republic of Uzbekistan	12,954	Republic of Latvia	–0,744
Republic of Tajikistan	4,057	Republic of Belarus	–0,786
Republic of Azerbaijan	2,830	Republic of Lithuania	–0,968
Kazakhstan	2,421	Republic of Moldova	–1,070
Republic of Turkmenistan	2,172	Republic of Georgia	–1,132
Kyrgyz Republic	2,053	Russian Federation	–1,224
Mongolia	1,226	Republic of Ukraine	–10,517

Source: compiled by the author according to the World Bank data (World Development Indicators) and the website "The population of the countries of the world in 1980–2020".

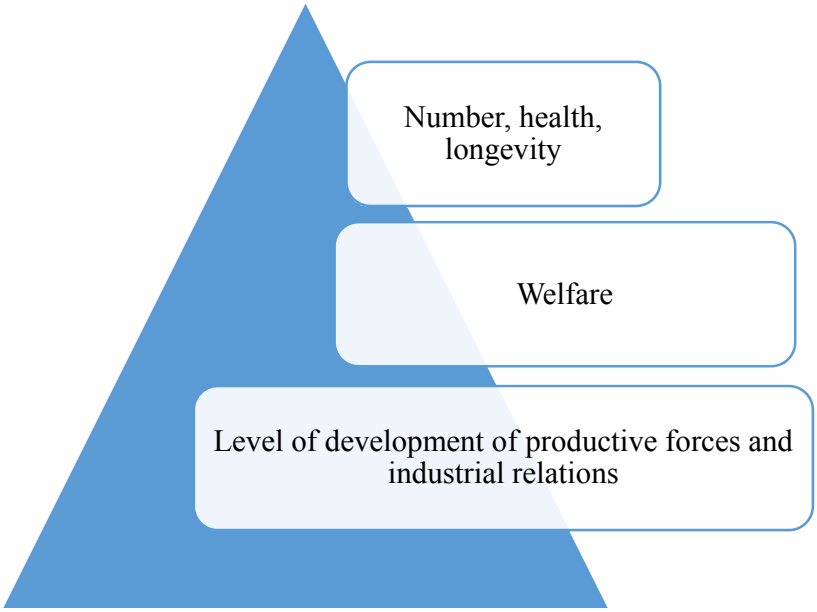

Fig 2. **Components of population savings**

Source: compiled by the author.

Thus, the goal of any people to maintain and increase the size of the Russian Federation in the short and medium term will not be fulfilled. It is a long-term, strategic goal that is important for the security of society. [5] Improving the welfare of all members of society is a basic condition for its achievement. And in order to ensure and maintain the level of well-being for a long time, it is necessary to successful, progressive, sustainable development of the country's economy, its administrative and territorial entities and economic agents (*fig. 2*).

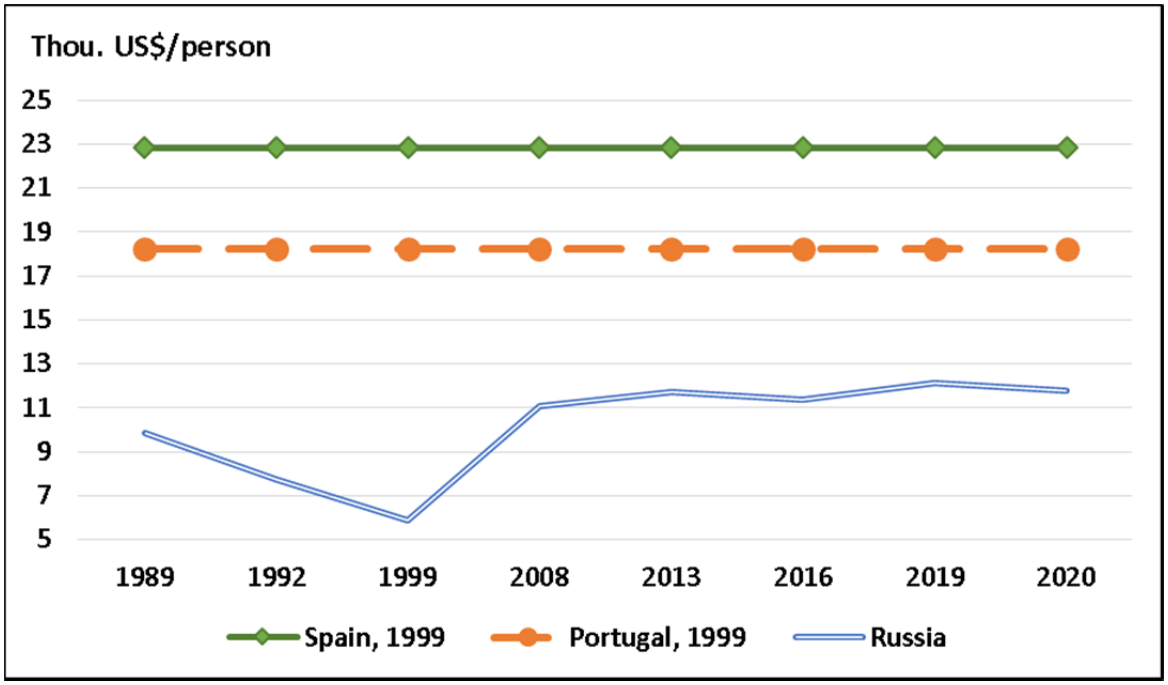

Fig. 3. **Dynamics of GDP per capita in the Russian Federation in 1989 2020, thousand constant 2015 US$**

Source: compiled by the author according to the World Bank data (World Development Indicators).

IMPROVING THE WELFARE OF CITIZENS

Increasing the welfare of all members of society is an important factor in saving people (growing populations, improving health, life expectancy, education and intellectual development). [2] Therefore, increasing prosperity — is a strategic goal of many countries of the world, including Russia. In international practice, the gross domestic product (GDP) per capita is an integral indicator of a country's level of welfare.

In December 1999, V.V. Putin, based on the calculations provided to him, noted: "These are the experts' calculations. In order to achieve per capita GDP at the level of modern Portugal or Spain — countries that are not world economic leaders, — we'll need about 15 years with a GDP growth rate of at least 8% per year\. ...Let's suppose that the experts' calculations are not quite accurate, the current economic lag is not so great, and therefore we can overcome it faster". [6]

Hopes for high growth of Russian economy have not been fulfilled (miscalculation is one of the reasons for setting unachievable goals and not implementing achievable goals). Average annual growth of Russian GDP in 2000–2014 (15 years after 1999) was 0.7%, +0.3% in Portugal, +1.5% in Spain.[10]

In 2000, Russia's per capita gross domestic product was twice as high as in 1999, but we still failed to reach the 1999 levels of Spain and Portugal (*fig. 3*).

Welfare goal not off the agenda, and the target set in 1999 is still to await implementation.

ECONOMIC GROWTH

In the article "Russia on the Border of the Millennium" published on 30 December 1999 V.V. Putin noted that, that "our country is not among the states that represent the highest levels of economic and social development of the modern world".[6] Almost 10 years later, in the National Security Strategy of the Russian Federation for 2020 was written,

[10] Calculated according to World Bank. URL: https://databank.worldbank.org/indicator/ SP.POP.TOTL/1ff4a498/Popular-Indicators#

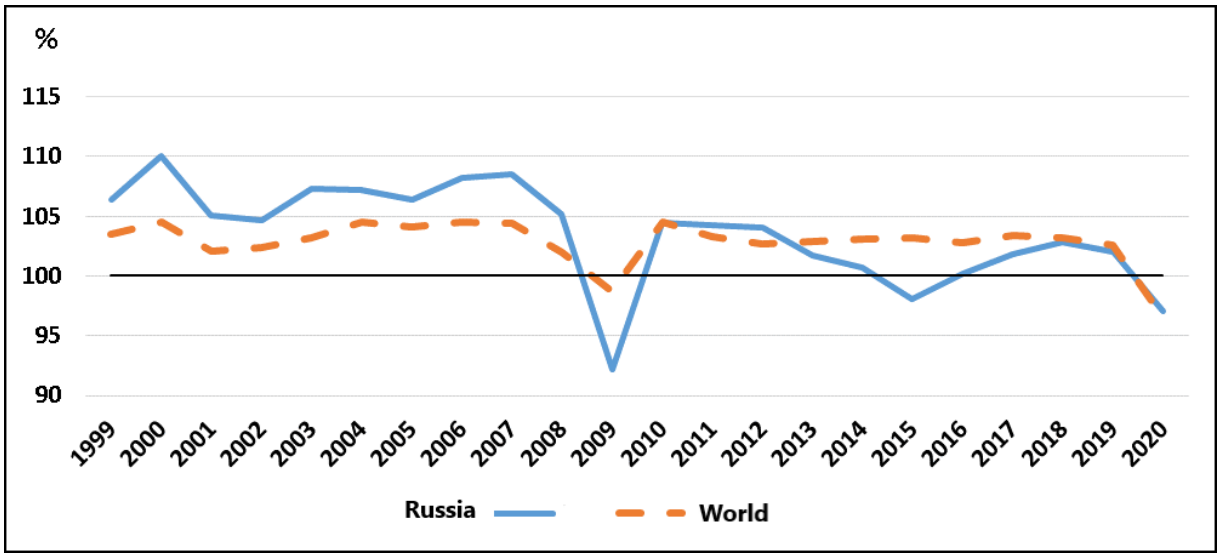

Fig. 4. **GDP growth rates of Russia and the world in 1999–2020, %**

Source: compiled by the author according to the World Bank data (World Development Indicators)*.
* For the calculation of growth rates, reference is made at USD 2015 years.

that "the strategic objectives of national security are entry Russia in medium-term into the top five countries by gross domestic product, as well as achieving the necessary level of national security in the economic and technological fields".[11] In 2018, the goal of "the Russian Federation becoming one of the world's five largest economies, ensuring economic growth above the world while maintaining macroeconomic stability" was set for the Russian government to achieve until 2024.[12]

Such tasks of recovery of the country's economy to the level (and above) of the most developed economies of the world had previously sets V. I. Lenin: "The war is inexorable, it raises the question with merciless harshness: either to perish or to overtake the advanced countries and overtake them also economically" [7, p. 199]), and I.V. Stalin: "We catch up and overtook the advanced capitalist countries in the sense of establishing a new political order, a Soviet order. That's good. But it's not enough. In order to achieve the final victory of socialism in our country, it is still necessary to catch up and overtake these countries also in techno-economic terms. Either we get it or we get crush". [8]

This strategic objective was dictated by the need for the country to survive in a hostile environment and is based on an objective pattern of living in a hostile environment, when progressive development is possible only through expansion (economic, military, territorial, political, scientific-technological, ideological, cultural, educational and information) in the global world. In the past centuries, the main instrument of expansion was war and religion, now — the so-called "soft power" and global economic aggression. [9]

The strength of a country's economy is usually judged by gross domestic product. In 1999–2008, 2011–2012 and 2020, the GDP growth rate of the Russian Federation was higher than that of the world, while in the remaining years it was lower (*fig. 4*).

While in 1999–2008 the average annual gross domestic product growth rate of the Russian Federation was higher than the world GDP growth rate by 3.4 p.p., in 2009–2020

[11] URL: http://www.kremlin.ru/supplement/424

[12] Decree of the President of the Russian Federation from 07 May 2018 No. 204 "On national goals and strategic objectives of development of the Russian Federation for the period up to 2024". URL: http://publication.pravo.gov.ru/Document/Text/0001201805070038

Table 3

The ratio of the GDP of the Russian Federation to the GDP of countries ranked 5th and 10th in terms of GDP in 1989–2020, %

Rank/Year	1989	1992	1999	2015	2018	2020
5th	74.2	54.2	32.4	46.5	46.5	50.4
10th	168.6	199.6	71.1	87.6	86.3	87.5

Source: compiled by the author according to the World Bank data.

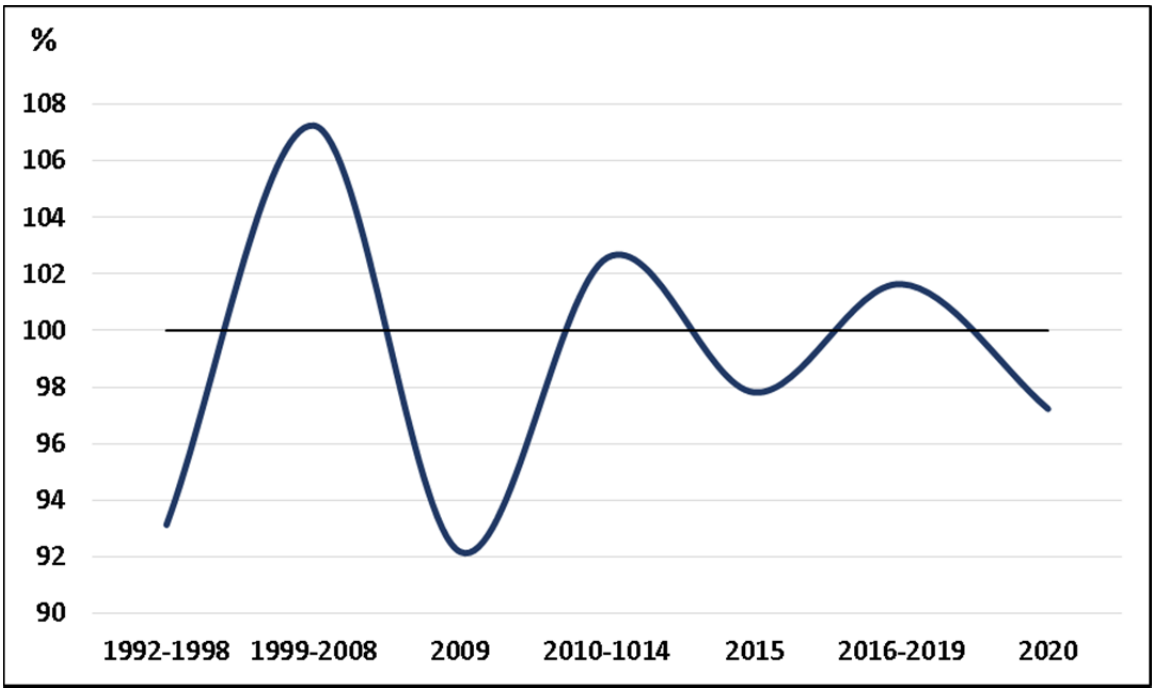

Fig. 5. **The average annual growth rate of GDP per capita in the Russian Federation in 1992–2020, %**

Source: compiled by the author according to the World Bank data.

it was 2.0 p.p. lower. The target of higher economic growth than world growth was largely done. However, the gross domestic product of the most advanced economies grew even faster during the period under review, and in 2020 Russia managed to become only one of the top 13 economies in the world.

According to the World Bank, the United Kingdom of Great Britain and Northern Ireland (UK) ranked fifth in the world in terms of GDP in 1999, 2009, 2015–2020 years. In 1999, the Russian Federation ranked 16th (in 1989–7th), before it was the Republic of Korea. In 2020, Russia climbed to 13th place, Republic of Korea — 10th. The ratio of the GDP of the Russian Federation to the GDP of the United Kingdom and the Republic of Korea is shown in *table 3*.

Thus, Russia has yet to achieve its goal of becoming one of the world's largest economies.

UNEVEN PROGRESS TOWARDS GOALS

So, in the period under research, the pace of the Russian Federation's approach to

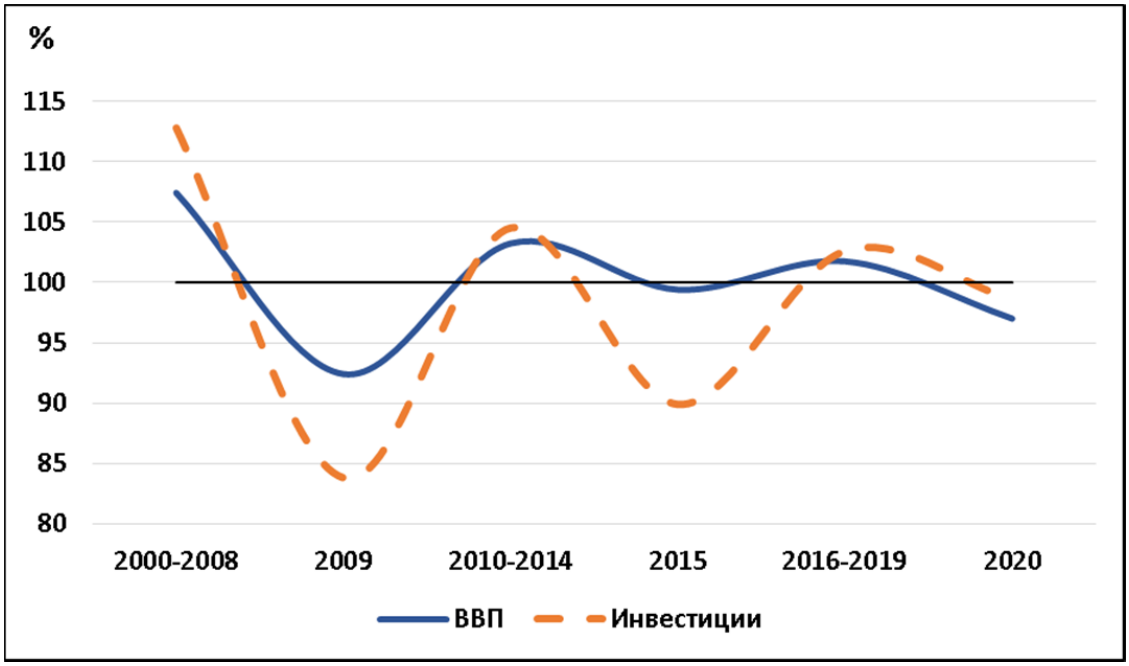

Fig. 6. **The average annual growth rate of GDP and the physical volume of investments in fixed assets in the Russian Federation in 2000–2020, %**

Source: compiled by the author according to the Federal State Statistics Service of the Russian Federation data.

the strategic goals under consideration fell short of expectations, the speed of the traffic changed over time, and therefore it was not possible to achieve the desired results everywhere. There is another feature of the implementation of modern Russia's long-term goals — a wavy trajectory, alternating between acceleration and deceleration, approximations and deviations from targets.

Slowdown and disengagement were most evident in the years when the Russian Federation's economy suffered the most from external and internal crises and shocks. Thus, the impact of the crisis of 2000–2001, caused by the collapse of stock indices of high-tech Internet companies, Russian economy felt the most in 2002, world financial and economic crisis 2008–2010 — in 2009, consequences of numerous anti-Russian sanctions — in 2015–2016 [10], consequences of the COVID-19 pandemic — in 2020. Such variations in the trajectories of the indicators of achievement are shown in *fig. 5, 6*.

The volumes of productive investments are the most important basis for building the country's economic power. According to the data of the Federal Service of State Statistics of the Russian Federation (Rosstat), the growth rates of GDP and fixed investments in 2000–2020 are linearly correlated (R^2 = = 0,9265), the relationship is direct with high level of confidence (α = 0,01). It is logical that the growth rate of fixed investment, as well as gross domestic product, has been unsustainable, with ups and downs. As with GDP, the fluctuation was decreasing (*fig. 6*).

Such fluctuations in trajectories towards indicators of strategic objectives are influenced by a variety of factors and circumstances, which may be both external and internal to the goal-setting, objective and subjective. Thus, society can change the trajectory of movement towards the goal in connection with the changed socio-political, demographic and ecological situation, the new quality of management of society, as a result of creation of new or exhaustion of previously existing resources, increase or decrease the efficiency of the use of these resources.

Examples of factors external to the society, capable of changing the path chosen by society to the target and the speed of its passage are natural and man-made disasters, climate change, wars, world financial and economic crises, epidemics and pandemics, the emergence of new or disappearance of pre-existing markets for the sale and purchase of products, measures of isolation of the country, its business entities from the global community, etc.

In case of negative influence of external and (or) internal factors, conditions and circumstances, the approach to the goal is interrupted and the distance from it occurs. Once the adverse effects have been overcome, the movement towards the target is resumed. However, as societies and activities, by their nature, internal organization and damage, recover at different speeds, have different resources and capacities, and time frames and implementation of different objectives do not necessarily coincide and may vary significantly.[13]

Depending on current and future expectations, society can not only change the ways and pace of movement towards benchmarks, but also adjust short-, medium- and long-term goals and their relevance.[14]

CONCLUSION

Failure to reach the target means unmet needs, breeds discontent, doubts, uncertainty of the future plan of action; requires a redefinition of objectives, time frames for their achievement and allocation of the resources necessary for their implementation. In addition, failure to achieve the stated objectives undermines public confidence in the authorities and representatives of the authorities and political parties responsible for the stated goals and decisions. "If you promise the impossible, what does it means? This generates expectations that will not be fulfilled, deceive people and sow mistrust in the entire political system of the country, rocking it from within, which is what it means".[15]

There are both objective and subjective reasons for non-achievement. The research results presented in this article show that strategic goals in modern Russia are not always achieved. There could be any number of reasons:

- the wrong target was chosen and it should not have been implemented;
- set an unattainable goal, the capacity of society and the external environment prevent it from being realized;
- extraordinary circumstances and so-called "black swans" prevented the achievement of the goal;
- the performers are unable to fulfil the tasks assigned to them;
- the goal was not going to be met. [11]

Different combinations of these causes are also possible.

There are different ways to respond to an unachieved goal: keep working; reschedule; adjust or completely eliminate quantitative targets, leaving the objective; replace the original wording of the objective with a new version; abandon the objective.

The goal is the perfect representation of the desired. The ideal image either becomes a reality, or continues to be perfect, or is transformed into a new ideal image (new ideal images). So is the goal: it can be achieved, maintained for the future, specified, refined, changed, replaced by a new goal or goals.

The real, which embodies the ideal, the imagined, the conceivable, does not necessarily coincide with the ideal. And this new reality gives rise to a new ideal, in our case — a new goal or new goals.

[13] These objective reasons will naturally lead to the fact that, after overcoming the COVID-19 pandemic, economies around the world will recover differently — some faster, others slower.

[14] It is natural to expect that the lesson of the COVID-19 pandemic will become more public attention to health and science.

[15] Address from the President to the Federal Assembly. URL: http://www.kremlin.ru/ events/president/news/62582

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Fintech as Accelerating Factor of Inclusive, Sustainable Development

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ABSTRACT

This article focuses on the impact of the financial sector on inclusive, sustainable development. The paper aims to study the impact of the fintech industry and financial inclusion on the development of the financial system to achieve the UN SDGs. We discussed various approaches to the content of the "fintech" and "ecosystem" terms and offered an interpretation of the term "financial inclusion". We used comparative and system analysis methods to study the publications of many authors who found that a developed and inclusive financial system affects the reduction of poverty and inequality, welfare and employment, consumer market, economic growth, sustainable development, etc. At the same time, we showed variants of the relationship between increased access to financial services and financial stability, which can both be positive and negative. The state of the financial services market in Russia, which ranks high in various ratings in terms of financial inclusion, is described in detail. Further, we considered the barriers to the growth of financial inclusion in Russia and ways to overcome them. The practical significance of the work lies in the possibility of its use in the development of key areas of financial market development. Next, more attention needs to be paid to regulatory influences on consumer behaviour in selecting services and their providers.

Keywords: sustainable development; UN SDGs; fintech; ecosystem; financial services; financial inclusion; financial accessibility; conditions and barriers to growth; ESG principles; responsible finance; SupTech and RegTech

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INTRODUCTION

The concept of sustainable development became the subject of international discussions in the 1970s and 1980s. Initially, social and environmental components was given important role. Human progress is not only measured by the quantity of economic growth traditionally measured by GDP, but also sustainable development that guarantees an equal opportunity to satisfy essential needs, both for all living people and for future generations. This requires society to limit population growth and the use of energy and minerals to solve environmental problems and preserve the biosphere.

The concept also included social components on shared prosperity, reduction of inequality and poverty, more equitable distribution of income, quality education, etc. After many years of work with international organizations, especially all the UN and the World Bank, improved understanding of sustainable development, formulated its indicators, overcome serious differences and found compromises.

As a result, on 25 September 2015 at the 70th session of the UN General Assembly, the leaders of 193 countries adopted a resolution "Transforming our world: Sustainable Development Agenda 2030", which includes 17 sustainable development goals (SDG), 169 targets and 232 indicators for all countries of the world for 2016–2030. It sets goals and targets on issues such as growth of prosperity

and employment, fight against poverty, increase of level of education, improvement of health, protection of nature, preservation of climate, improvement of institutional conditions of development of economy, innovations, etc.[1]

UN SDG is provided on principles such as universality, interconnectivity and indivisibility, multi-stakeholder partnership and inclusiveness, which should ensure a balance in the pursuit of economic, environmental and social objectives.

Organisation for Economic Co-operation and Development (OECD) notes the important role of business in the implementation of SDG UN, which through its investments contributes to the creation of jobs, raising living standards, the development of competences and technologies.[2]

From the point of view of businessmen and managers, the concept of sustainable development has led to a significant expansion of the principles of corporate social responsibility (CSR), which formed in the 1970s last century and compared to the UN SDG contained far fewer social, environmental and climatic requirements for public and private companies.

In recent years, major investors, corporations, central banks and governments of developed countries, as well as international economic organizations of the UN have been actively implementing ESG-principles in business practices:

- responsible attitude to the environment (Environmental);
- high-social responsibility (Social);
- high-quality corporate governance (Governance).

To ensure sustained growth of the financial sector, developed countries have begun to promote the concept of responsible financing at the global and national levels, based on ESG-principles. Besides them, responsible financing (RF) includes concepts such as disclosure, inclusiveness, fair pricing, respectful and dignified treatment of customers, provision of quality products and services.

RF is focused on the needs of customers and implies responsible (accountable), transparent and ethical provision of financial services. It is developing along three main directions: consumer protection, self-regulation of financial institutions and improvement of financial literacy of clients. In fact, it is about responsible financial inclusion (affordability in the broad sense).

Integrating UN SDG and ESG-principles requirements into company business processes, especially oriented towards international markets, requires significant strategy changes, managements and unforeseen cost increases in environmental, social and management policy expenditures. This additional burden will affect consumers through higher prices for goods and services.

At the same time, following the UN SDG and ESG-principles promises some benefits in the future, as it increases competitiveness, investment attractiveness and strengthens the image in the eyes of stakeholders. On the contrary, ignoring them dramatically reduces and in some cases eliminates the chances of attracting investors, partners and customers.

At the same time, the business agenda of sustainable development — it is not only increased environmental and social responsibility requirements for companies and banks, but also an incentive to introduce new patterns of production and consumption, that change the structure of demand and supply, increase the efficiency of work. Dictated by developed countries, this agenda became mandatory, including for Russia, where the number of companies and banks following ESG-principles is growing rapidly.

Ministry of Economic Development of the Russian Federation expects the emergence of

[1] Resolution adopted by the UN General Assembly on 25 September 2015 "Transforming our world: Sustainable Development Agenda 2030". URL: https://unctad.org/system/files/official-document/ares70 d1_ru.pdf

[2] OECD (2016), Development Co-operation Report 2016: The Sustainable Development Goals as Business Opportunities, OECD Publishing, Paris. 320 p. URL: https://www.oecd.org/dac/development-co-operation-report-2016.htm.

new and growing existing highly competitive niches of goods and services in different industries due to the trend towards sustainable development. According to their estimate, the total global volume of such industries in 2020 was 6.5 trillion USD or 7.5% world GDP). This amount will increase to 16.3 trillion USD by 2030. This information is collected from various sources, according to the Ministry's review, so the amount is fictitious and aims to demonstrate the order of numbers and high growth rates in this industry. Ministry of Economic Development of the Russian Federation monitors financial services (products and tools) among other industries related to the implementation of the UN SDG.[3]

One such industry — financial technology, or short for FinTech. They are defined by the Financial Stability Board (FSB) "financial innovation of technology-based, which may lead to new business models, applications, processes or products with corresponding material impacts on financial markets, institutions and the provision of financial services".[4]

Basel Committee on Banking Supervision defines FinTech as "technology-induced financial innovation leading to new business models, applications, processes or products that will subsequently affect financial markets, institutions or the production of financial services".[5]

The Bank of Russia defines financial technology as "the provision of financial services and services using innovative technologies, such as Big Data, artificial intelligence and machine learning, robotization, blockchain, cloud technology, biometrics and others".[6]

The authors interpret FinTech as innovative technologies in the financial sector that change, break, replace, support or develop the established value chain (or parts), offering more simple and cost-effective solution for business and consumers.

Most popular financial technologies include payments (transfers, peer-to-peer or P2P payments), credits and loans (crowdfunding, peer-to-peer credit), insurance, personal finance, blockchain (cryptocurrency), asset management.

According to the International Telecommunication Union (ITU), information and communication technologies (ICT) can accelerate the achievement of all 17 UN SDG.[7]

First of all, new digital technologies help to integrate the poorest countries into the financial system (SDG No. 1 "Poverty eradication"). Also, FinTech-industry to the achievement of SDG No.9 "Building resilient infrastructure, promoting inclusive and sustainable industrialization and innovation". FinTech also plays essential role in solving task 9.3: "Increase access for small-scale industry and other enterprises, especially in developing countries, to financial services, including low-cost credit, and to enhance their integration into supply chains and markets" and task 9: "Increased access to information and communication technologies and strive to achieve universal and affordable Internet access in the least developed countries by 2020". Financial technologies also contribute to achieving SDG No. 8 "Decent Work and Economic Growth".

In Russia, FinTech-industry contributes the most to the achievement UN SDG No.9 "Industrialization, innovation and infrastructure". Significant work is

[3] Global Sustainable Development Trend: business opportunities. review of new niches emerging in relation to the un sustainable development goals. Department of Multilateral Economic Cooperation of the Ministry of Economic Development of Russia. December 2020. URL: https://www.economy.gov.ru/material/file/45e459dca8acad4ecdd396aef4448e10/38526748.pdf

[4] URL: https://www.fsb.org/wp-content/uploads/R 270617.pdf

[5] Rational practice: Implications of fintech development for banks and banking supervisors: Advisory document. Basel Committee on Banking Supervision. 2017. URL: https://www.bis.org/bcbs/publ/d415.pdf/

[6] Bank of Russia. Development of financial technologies. URL: https://cbr.ru/fintech

[7] MSE website: "ICT for achieving of the United Nations Sustainable Development Goals". URL: https://www.itu.int/ru/mediacentre/backgrounders/Pages/icts-to-achieve-the-united-nations-sustainable-development-goals.aspx.

also under way to achieve SDG No. 8 "Decent work and economic growth" and SDG No.1 "Poverty eradication". FinTech products, such as e-wallet, online payment service, e-commerce, online loans, P2P-lending and crowdfunding, contribute most to achieving UN SDG No.1, No.8 и No.9.[8]

To achieve the UN SDG FinTech-industry as part of the financial system works in the following directions:

- financial inclusion: access to financial services, real-time customer service in remote areas;
- sustainable supply chains: services that reduce the number of intermediaries between producer and end user, as well as services that provide buyers with transparent data on supply chain transactions;
- resource conservation: transfer of business-operations to online-space, remote monitoring of resource usage;
- investment in sustainable development: investment transparency.

United Nations Environment Programme (UNEP) experts consider that the progress of FinTech has a significant impact on the financial sector within the UN SDG:

1. Contributes to decentralization of the financial system;
2. Increases speed and transparency of transactions;
3. Improves risk management;
4. Reduces business costs;
5. Multiplies the effectiveness of business models;
6. Increases competition;
7. Stimulates innovation, creating FinTech-startups.

Thus, FinTech-industry has shared and contributed to sustainable development. Their relationship is reflected in the term introduced by Mark Carney, who from 2013 to 2020 headed the Bank of England: "FinTech for sustainable development" — FT4SD. It is also evidence of the effort to integrate the UN SDG into the structure of the financial system.[9]

DEMOCRATIZATION OF DIGITAL FINANCIAL SERVICES

The global financial crisis of 2008–2009 gave powerful incentive to the development of FinTech-companies, whose transaction costs were much lower than those of traditional market players. FinTech-companies gradually began to seriously compete with banks and various financial intermediaries, which accelerated the process of innovation due to the emergence of many FinTech-startups.

Thanks to the rapid development of FinTech based on breakthrough digital technologies, new services are emerging in the field of finance, and the traditional ones become faster, convenient, efficient and less costly and more accessible. FinTech-startups have significantly accelerated the process of democratization of digital financial services; they are literally bursting into this high-yield market, successfully move competitors using traditional technologies, thanks to more preferred solutions for customers. FinTech not only forms new business models, but also performs an important function — expands the access of the population and firms to financial services, which is called "financial inclusion".

The first financial technology may be thought to have come with the invention of the telephone and telegraph in the mid-19th century; a century later, credit cards, ATMs and computers, Internet and mobile communications provided massive remote access to financial services.

Increased price competition has provided to greater consumer access in a number of financial market sectors (first of all, payments,

[8] Private financial technologies as a tool for sustainable business development in Russia and Kazakhstan. Trends in the market of financial technologies. Research Center of the company "Deloitte" in CIS, 2018. URL: https://www2.deloitte.com/ru/ru/pages/research-center/articles/chastnye-finansovye-tekhnologii-kak-instrument-ustojchivogo-razvitiya-biznesa-rossii-kazahstane.html

[9] Fintech and Sustainable Development: Assessing the Implications. The UNEP Inquiry. 2017. URL: https://www.unep.org/resources/report/fintech-and-sustainable-development-assessing-implications-summary

transfers, microloans, etc.), that spurred the technology race even further. As a result, of the unprecedented acceleration of the pace of development and introduction of new technologies, the FinTech-industry became the fastest growing industry, the leader of innovation.

FinTech-companies develop new software, mobile internet applications, business processes and business models. They are moving from single-product development to the creation of hybrid products that provide multiple solutions for consumers of financial services.

In the early 2010s, commercial banks and other traditional financial market players began to not only compete, but also cooperate with FinTech-companies in various forms of partnership. Began the stage of development of the industry, which is called FinTech 2.0.

Many large banks — major consumers of products FinTech — decided to engage themselves in a new process of creation and implementation FinTech-innovation, have become very interested in FinTech-startups. Banks started selling FinTech-products and related services to their customers, by implementing a financial supermarket model based on digital platforms and applications, which have emerged as "markets" (marketplaces), where sellers and buyers of goods and services communicate remotely and without intermediaries. At the same time, banks began to acquire existing or maintain new start-ups, acting as venture investors, incubators or accelerators.

At the same time, large telecommunications companies have begun to perform some banking functions — issue bankcards and provide a range of financial services. Also appeared virtual online banks (neo-banks) based on digital, for example, Tinkoff Bank, Modulbank, Bank "Tochka" and others.

In the 2010s, consumer service companies (marketplace), Internet service providers, telecom operators increasingly embraced the financial supermarket model, that resulting in an emergence of large and small digital ecosystems.

As defined by the Bank of Russia, "ecosystem (digital ecosystem) — a set of services, including platform solutions, a group of companies or companies and partners, allowing users to obtain a wide range of products and services in a single seamless integrated process. An ecosystem may include closed and open platforms. The range of services offered by the ecosystem satisfy most of the customer's daily needs or is built around one or more of his basic needs (ecosystems at an early stage of their formation or niche ecosystems)".[10]

In our time, digital ecosystems offer not only financial services, delivery of consumer and food products, but also online services in the field of health, education, employment, construction, real estate, tourism, telecommunications, entertainment, lifestyle, B 2B and others.

For example, in Russia on this way went Sberbank (from 2021 — "Sber") and began building an ecosystem that included more than 50 companies on a single digital platform in 2017. Own ecosystems are also created by VTB, "Alfa-bank", "Tinkoff Bank", "Yandex", "VK Group" (early — "Mail.ru Group"), Rostelecom, MTS etc. They are sometimes called "BigTech" because these technology giants dominate consumer markets. It is they who are acquire the most startups in competition with competitors.

The most promising technologies in the FinTech market authors consider: Big Data analysis, artificial intelligence, blockchain, mobile and cloud technologies, biometrics, robotization, Internet of things, virtual/augmented reality and 3D modeling.

At the same time, the rapid development of FinTech increases cybersecurity risks. In Russia, as in advanced countries, innovative regulatory technologies (RegTech) were used to detect

[10] Ecosystems: approaches to regulation. Report for public consultations. Bank of Russia — 2021. URL: https://www.cbr.ru/Content/Document/File/119960/Consultation_Paper_02042021.pdf/

regulatory requirements and manage risks. They are used to identify customers, detect suspicious transactions and attempts of fraud, compliance control, etc.

The financial supermarket model has been transformed into an unbridable marketplace model, when a business is not established on selling goods and services, but depends on the ability of the ecosystem to quickly and qualitatively satisfy the maximum number of everyday needs of customers through a single technological platform.

According to consulting company McKinsey, 12 large-scale ecosystems could emerge around the fundamental needs of humanity by 2025, which could be about 30% of global GDP (60 trillion USD). Already now digital ecosystems Alibaba, Google, Amazon, Apple, Facebook, Microsoft and Tencent are among the 12 largest global corporations by market capitalization.[11]

The ecosystem business model is not built around products or services, but around the customer. The task of artificial intelligence is to accurately determine the full range of everyday needs of the client, his tastes and preferences, lifestyle and lifestyle. This will allow you to remotely offer customers the necessary products or services on acceptable payment terms with a choice of convenient place and time of delivery. This task is still far from being solved, and customers continue to receive a lot of unnecessary advertising. Nevertheless, ecosystems allow for faster and more efficient implementation of one of FinTech's main functions — expansion of financial inclusion.

The emergence of digital platforms and ecosystems can create risks of monopolization of markets, as warned by the Bank of Russia, which began to develop common rules for competition and business for them. Other issues that must be addressed included cybersecurity, privacy and personal data; there is a move towards FinTech 3.0.

Using Artificial Intelligence (AI) and Digital Platforms, FinTech-companies multiply expand customer base, as well as being able to influence consumers of financial services not only through advertising, but also through business analytics, robot-consultation and other tools.

TERMINOLOGICAL AND CONCEPTUAL PROGRESS

In parallel with the development of the concept of sustainable development among scientists and policymakers at the national and international levels, the whole human idea of influence inclusion (it is inclusiveness, comprehensiveness, accessibility etc.) was widely discussed (as an important resource for development in all spheres of activity, from politics and economy to education and psychology.

Official documents of various countries, including Russia, increasingly mention the inclusive character of globalization, international cooperation and dialogue, the political process, economic growth and development, prosperity, distribution of the benefits, investment, the multilateral trading system, etc. All these types of inclusion appear in one document — Johannesburg Declaration X of the BRICS Summit of 26 July 2018. To this should be added the inclusive education, the practice of which is enshrined in the Federal Law of 29 December 2012 No.273 "On Education in the Russian Federation".[12]

The world's debate about an era of inclusive capitalism is grow. Given the rate spreading the message of involvement, we can assume that an inclusive future awaits us.

In the economic paradigm, there has been a growing recognition that one of the main goals is to develop human capital and to ensure welfare and well-being for all, i.e., development and growth must be sustainable and inclusive. Inclusion implies equal opportunities for

[11] URL: https://www.mckinsey.com/industries/financial-services/our-insights/insurance-beyond-digital-the-rise-of-ecosystems-and-platforms

[12] Johannesburg Declaration X of the BRICS Summit of 26 July 2018. URL: http://www.kremlin.ru/supplement/5323

people to contribute to and benefit from economic growth.

World Economic Forum (WEF) experts started publishing inclusive development index (IDI) in 2017, which rated 107 countries on the criteria of growth, justice and sustainability. Its authors considered that existing development estimates, such as per capita GDP, did not fully characterize it. Comparative studies show, that countries with a more inclusive socio-economic system have greater economic sustainability. Russia ranked 13th out of 78 developing countries in this index, between Argentina, Thailand (11th and 12th, respectively) and Peru and China (14th and 15th).[13]

UN SDG No.8 supports the promotion "sustained, inclusive and sustainable economic growth". Economic inclusion has been recognized as essential to the sustainability of economic growth in order to create an enabling environment for improving the quality of life and ensuring equality of opportunity for all groups of the population.

Financial inclusion became one of the priorities for achieving the goals of sustainable and inclusive growth at the beginning of the zero years — public and business involvement in financial services.

Access to modern financial instruments may not only directly benefit the consumer, but also, to a large extent, determine its capacity to carry out effective economic activities, either through employment or through entrepreneurship. Financial services operate as infrastructure systems, such as roads or communication networks, which are obvious public goods. [1]

In the last decade, a lot of research has appeared in the world economic science, analysing the impact of the quantity and quality of total financial services consumption in different countries on various socio-economic indicators of sustainable inclusive development.

However, in Russia the interest in this issue is noticeably lower. This may be due to terminological uncertainty and difficulty in translating the term "financial inclusion" from English into Russian. In English, "inclusion" means the incorporation of someone or something in the general agenda (or some set). May select synonyms to the word "inclusion": involvement, complicity, joining, interpolation, affiliation, etc.

Initially we have established two variants of translation: "financial inclusiveness" and "financial affordability". The first is inaccurate, as inclusiveness in English — "inclusivity", but not "inclusion". The second no longer covers the full scope of the term, in which new elements of the term are added over time. Versions such as "financial involvement" and "financial inclusion" have been introduced, but they are still less popular.

It is possible to agree with Yu.A. Danilov and D.A. Pivovarov that the translation of the term "inclusion" as "инклюзия" (in Russian) does not contribute to understanding its meaning. They consider the most acceptable option of "involvement in financial transactions" or simply "involvement in finance". [2]

In our view, versions can be added to this: "inclusiveness of the population with financial services", "financial inclusiveness", "financial affiliation", "prevalence of financial services", etc. The term "financial inclusion" (FI) is often used in scientific literature to avoid different interpretations.

Its importance for the global sustainable development agenda is demonstrated by the fact that the leaders of the "Group of 20" (G20) in 2010 approved "Roadmap for achieving affordability".[14] Thus, an international consensus was reached on financial inclusion, which the World Bank has recognized as a key factor in improving overall well-being in the fight against extreme poverty.

[13] URL: https://www.vedomosti.ru/economics/articles/2017/01/16/673218-rossiya

[14] Global Partnership for Financial Inclusion (GPFI). Action Plan for Financial Inclusion. July 2017. URL: https://www.gpfi.org/sites/gpfi/files/documents/2017%20G20%20Financial%20Inclusion%20Action%20Plan%20final.pdf

Leaders of the "Group of 20" (G20) created of the Global Partnership for Financial Inclusion (GPFI), which includes representatives of national regulators, monetary and supervisory authorities from 94 countries, including the Bank of Russia. In GPFI exchanging of best practices on situations management, risk-related policies, their concentration, regulatory measures that can help the poor to gain access to financial services. The Partnership also addresses financial literacy, financial consumer protection, and collects information and statistics on national affordability strategies.[15]

As defined by the World Bank, FI means that financial services that are widely available to retail consumers and that can contribute to the welfare of both individual users and the general population.[16]

To date, there is no universally accepted concept of financial inclusion (FI), it is being continuously updated and refined. Thus, the Bank of Russia in 2015 gave a broader definition of "financial availability" and, in addition to physical access to financial services ("proximity of infrastructure"), included such components as price, mental and assortment demand, as well as ultimate utility and security.

In 2018, the Bank of Russia developed and approved "Strategy for increasing affordability in the Russian Federation for 2018–2020", which defines the main goals and objectives for improving the availability of financial services, namely:

- increasing the level of availability and quality of financial services for consumers of financial services in remote, sparsely populated or inaccessible areas, subjects Small and Medium-Sized Businesses (SMB) and groups with limited access to financial services (low income, persons with disabilities, older persons and other people with limited mobility);
- improving the speed and quality of access to financial services for people with Internet access.

Since April 2020, ensuring the availability of financial services in the territory of the Russian Federation is enshrined in law among the main functions of the Bank of Russia. Bank of Russia's financial inclusion activity is aimed at creating conditions and rules in the financial market, where every citizen, regardless of his or her place of residence, income or health status, can obtain the financial services he or she requires.[17]

Yu.A. Danilov and D.A. Pivovarov give this definition of financial inclusion: "This involves economic agents (primarily households and firms) in financial transactions". Accordingly, increasing financial inclusion means increasing the involvement of economic agents in financial transactions. In the case of a specific type of economic agents involving (involved) in financial transactions, the term "financial inclusion" applies to this type of economic agents, for example "financial inclusion of households" or "financial inclusion of firms". [2]

Within the framework of this article, the authors define FI as the involvement of a significant part of the population and business in the sphere of financial services, characterized by equal opportunities of access to the market and resources. In a number of cases "financial inclusion" is replaced by "financial availability", since such translation of the term is widely distributed in the domestic literature and is used by the Bank of Russia.

In foreign literature there is the term "FinTech Adoption", which is used in comparing the level of distribution (consumption) of financial services of different countries. This term, in our view, can be translated more precisely: "FinTech implementation", "adoption of FinTech", "diffusion of FinTech", "consumption of FinTech services", etc.

[15] "Group of 20". Official website of World Bank. URL: https://cbr.ru/about_br/ip/momo/g20

[16] World Bank. 2014. Global Financial Development Report 2014: Financial Inclusion. Washington, DC. URL: https://openknowledge.worldbank.org/handle/10986/16238; jsessionid=555D 5C 09FF1EE 4E 8E 01CF49B 610395F4

[17] Official website of the Bank of Russia. URL: https://www.cbr.ru/develop/development_affor /

The main (basic) financial services are savings, credit, payments and transfers, insurance (insurtech).

The most commonly used indicators of financial inclusion in international studies on the relationship between financial inclusion and financial stability and economic growth are the following:

- number of units of operating commercial banks and ATMs per 100 thous. people adult population;
- percentage of adult population holding an account and/or using a credit/loan for the last year in a formal financial institution;
- the share of active loans for SMB in the total portfolio of active loans.

Financial inclusion is not only measured by the extent of people's access to financial services, but also their quality, convenience, efficiency, safety, and also their impact on reducing poverty and inequality, (including gender) welfare and employment, consumer market, economic growth, sustainable development, etc.

Therefore, FI is also measured by the following parameters:

- access — physical accessibility of service points, the number of accounts opened in financial institutions, the proportion of the population with an account;
- quality– range of financial services, level of consumer understanding of affordable financial services;
- use — regularity, frequency and duration of consumption of various financial products;
- impact — changes in consumer living standards through the use of financial services.

Physical, price, mental and assortment components of FI are also evaluated.

In the literature you can find other characteristics of FI, namely:

- uniform availability;
- regular use;
- good quality;
- welfare potential.

Although policies and actions to enhance financial inclusion have no long history, many foreign empirical research have revealed a range of macro- and microeconomic indicators that support the hypothesis that the growth of inclusive financial systems has become an important component of sustainable socio-economic development.[3]

Other studies show that FI development can play a key role in reducing poverty and improving macroeconomic indicators, including economic development and stability. Thus, analysis of macroeconomic data shows that a developed and inclusive financial system reduces information and transaction costs and at the same time stimulates investment decisions, technological innovation and long-term growth. [4]

Conversely, a lack or low level of access to financial services (financial exclusion) can lead to a "poverty trap", exacerbate income inequality and stunt economic growth.

Advanced FinTech-companies find gaps in financial availability and free market niches, create attractive consumer offers. They respond more flexibly and quickly to market needs, actively develop and implement new services and products, get rid of unnecessary intermediaries.

Moscow School of Management SKOLKOVO cites a number of studies on the positive impact of financial inclusion, which is measured, for example, by an index of the density of ATMs and bank branches, the growth of consumption, savings, productive investment, and the dynamics of women's empowerment. The benefits to SMB from increased access to credit and insurance schemes, for example for farmers, are assessed.

For example, surveys and longitudinal studies have found statistically significant improvements in people's mental health, financial advice and access to various financial services, which shows the positive impact of FI on health.[18]

[18] Financial inclusion beyond accessibility. Center for Financial Innovation and Cashless Economy of the Moscow School of Management SKOLKOVO. 2018. URL: https://finance.skolkovo.ru/ru/sfice/research-reports/1810–2018–11–15

Financial inclusion has become a public good that benefits citizens and businesses in a variety of ways. Thus, the transition to non-cash payments not only increases the efficiency and speed of cash flows, but also their transparency and security, which contributes to the fight against corruption and increase the security of citizens and firms.

Many researchers, participants and regulators of financial markets, as shown in a review of the Bank of Russia, consider that the desired direction of financial market development — such that financial affordability contributes to financial stability, and financial stability in turn has a positive impact on long-term affordability. At a minimum, financial accessibility and financial stability should be consistent. Moreover, there is a need for positive linkages between different financial policy objectives — financial accessibility, financial stability, financial integrity/crime prevention, consumer protection of financial services, financial literacy, etc.

However, the relationship between improved access to financial services and financial stability, for example, can be positive — as a result of the growth of savings and insurance services, and negative — with excessive access to credit.[19]

A number of papers show a non-linear relationship between economic growth and financial depth — the saturation of the economy with monetary resources and financial instruments, with the complexity and sophistication of the financial and monetary system.

The OECD report "Finance and inclusive growth" shows that the sign of dependence (positive or negative) economic growth on the level of development of the financial sector is determined by the level of financial depth. Faced with the limits of the beneficial growth of financial depth, the researchers asked that in these circumstances it would be possible to continue to positively influence the economic performance of the financial sector. Increased financial depth creates greater opportunities for economic development, but the realization of these opportunities depends on the rest of the financial system, which is called efficiency, stability and affordability. [5]

More recent research has shown that the increasing depth of the financial sector may not always lead to faster economic growth. On the one hand, the development of financial markets has contributed to economic growth by creating opportunities for economic investment, reducing information asymmetries and allowing economic agents to diversify sources of finance. On the other hand — when a threshold is reached, the level of development of the financial sector is excessive in terms of rapid accumulation in a system of various risks. The latter, in turn, reduce stability and economic growth and increase its volatility.

The aforementioned circumstance is particularly relevant for countries with weak regulation and supervision of financial markets. Consequently, it can be argued that the relationship between financial and economic development is not linear. In other words, there is supposed to be a saturation point in the development of financial markets in terms of opportunities to stimulate balanced economic growth, what is called the effect of "too much finance". Overheated financial markets act as a catalyst for slowing down the economy as a result of accumulation of significant risks, high probability of financial crises and increased volatility of the economy. [6]

In this sense, greater attention should be paid to all kinds of risks at too high a level of financial inclusion, when there are no barriers to entering the market of services for anyone, including fraudsters, hackers and all sorts of asocial personalities. So far, such studies are insufficient, they are "not in trend", so they are less in demand, than those that demonstrate the highly positive impact of rapid financial inclusion.

[19] The relationship between affordability, financial stability and economic growth: a review of publications. Consumer Protection and Financial Services Service of the Bank of Russia. Moscow. 2018. URL: https://cbr.ru/Content/Document/File/44100/publ_15022018.pdf

Many attempts are made to determine the optimal level of development of the financial system, which would simultaneously ensure both economic growth and stability. The increase in financial depth has a positive impact on growth to a certain limit, as its excessive or too rapid development can cause the negative effect of "too much finance".

In order to reduce the volatility of economic growth, it is necessary to achieve a balanced development of the main parameters of the financial system, as described above. [7]

The level of FI prevalence has the greatest impact on the financial system than such indicators as:

- depth;
- physical and price availability;
- efficiency;
- stabillity.

World Bank experts have concluded that firm inclusion is the most important contributor to long-term growth and is much more likely to demonstrate synergy with stability than household inclusion. In addition, it contributes to greater prosperity for all, alongside household inclusion. [8]

Another example: if in most countries the increased availability of financial services has been accompanied by increases in payments and savings, that in some countries the increasing proportion of the population with bank accounts has reduced their use, except for online services.

Cases of neutral or negative impact of FI expansion on different parameters of the financial sphere are due to peculiarities of financial systems of different countries and/or irrational behavior of regulators, government and non-profit organizations implementing policies to improve access to financial services. For example, in one African country, the ill-conceived organization of a financial assistance programmer has not only benefited microbusinesses, but also to shadow financial service providers.

A feature of modern financial services is that their providers may discriminate against customers by denying them services, both implicitly (through price barriers) and explicitly, for example, when banks assess the ability of a potential borrower to repay a loan through their own scoring process, which is largely opaque and usually irreversible to the customer. It is understandable that such a system of discrimination is absolutely necessary from the point of view of credit risk management, but it may erroneously limit the ability of legal and physical persons to act as subjects of the modern market economy.

In this way "financial exclusion" groups can be created by combining different barriers: physical, social, economic, legal, etc. For example, in low-income developing countries, up to 80% of the population may be excluded from financial services, mainly because of poverty and lack of financial infrastructure. In developed countries, "financial exclusion" groups account for 10 to 15% of the population for more complex reasons of exclusion.[20]

FINANCIAL MARKET OF RUSSIA: IDENTITY OF GROWTH

Although the World Bank classifies Russia as a developing market, our country faces problems of financial inclusiveness, more typical for countries with developed economies. In Russia, the urban population is predominant with almost 100% basic literacy, one of the highest rates of enrolment in higher education in the world, with an income above the average. In addition, Russia has a high rate of skilled employment and a relatively low unemployment rate. Russia has a huge reserve of talents in the sphere of information and communication technologies (ICT) and is one of the world's leading suppliers of mathematicians, programmers and engineers to other countries.

At the same time, middle-aged and older people born during the USSR, where the range

[20] World Bank. 2020. "Financial Inclusion" Europe and Central Asia Economic Update (Spring), Washington, DC: World Bank. DOI: 10.1596/978–1–4648–1409–9. URL: https://openknowledge.worldbank.org/handle/10986/31501

of financial services was very small, do not have sufficient knowledge of modern finance and experience in its use.

The development of financial technology in our country has been significant but uneven.

On the one hand, there is a noticeable lag of Russia from many countries of the world in the creation of new technologies, venture investments, including FinTech-startups. For example, in the rating World Intellectual Property Organization (WIPO) "Global Innovation Index 2021" Russia ranked 45th in the comparative analysis of innovation systems and innovation development of 132 countries.[21] On the other hand, Russia ranks high in various ratings on the level of availability, distribution and consumption of financial services, mainly due to the massive use of online payments and money transfers.

Thus, the share of non-cash payments in retail payment turnover from 2013 to 2020 increased almost 5 times and by 01 January 2021 exceeded 70%. The use of payment cards is also growing rapidly: share of payments for goods (works, services), committed by using payment cards on the territory of Russia, in the total volume of retail trade, public catering and paid services to the population increased by 10.6 p.p., up to 67.6%.

The total number of payment cards issued by Russian credit organizations on 01 January 2021 was 305.6 million units (an increase of 6.9%) with a population of 146 171 015 people.

According to adult surveys and subjects of small and medium business (SMB), commissioned by the Bank of Russia in May 2019, 93.7% of adults used the account for the past 12 months (an increase of 6.2 p.p. compared to the May 2019 survey), with 74.8% — intensively (3 or more operations per month, increase of 20.8 p.p.).[22]

Research of auditing and consulting company Ernst & Young (EY) "FinTech Adoption Index 2019" shows that 82% of citizens use different services. China and India led the ranking, with FinTech-services used by 87% of residents, followed by South Africa and Colombia. EY conducted a similar study in 2017, since then the leaders remained the same, with FinTech-services penetration in China increased by 18, in India by 35, and in Russia by 39 p.p.— almost twice. During the research, EY analysts surveyed about 27 thous. people in 27 markets on five continents. Respondents were asked to assess how much they use FinTech-services.

The most popular services in Russia were P2P remittances and payments, to a lesser extent — budgeting and financial planning, savings and investment, credit and insurance. At the same time, some FinTech-services, for example investment in securities, use less than 1% of Russians, while in the US — about 50% of citizens.[23]

However, this high position of Russia in the rating of financial services coverage is partly due to the fact that Ernst & Young experts conducted surveys only in Moscow and Saint Petersburg, where the level of development of the FinTech sector is much higher than the average in Russia.

In various world ratings the level of penetration of financial technologies in Russia is estimated in the range of 40 to 80%. [9]

Russia achieved quite high values for some indicators of financial development: ratio of capitalization and turnover of the stock market to GDP, number of ATMs per 100 thous. adult population, etc. However, the average depth of the insurance sector (ratio to GDP of premiums collected in insurance), as well as the scale of the mortgage market and the ratio of assets of mutual and pension funds to GDP is lower.

According to the sub-index of financial services coverage, Russia is close to such

[21] World Intellectual Property Organization (WIPO). "Global Innovation Index (GII) 2021". URL: https://www.globalinnovationindex.org/gii-2021-report

[22] Analytical summary of indicators of financial availability for 2020 (based on the results of the 2021 measurement). Bank of Russia. July 2021. URL: http://www.cbr.ru/Content/Document/File/124646/acc_indicators_29072021.pdf

[23] Global Fintech adoption index 2019. EY report. URL: https://www.ey.com/en_gl/ey-global-fintech-adoption-index

countries as Colombia, Romania and Peru; by sub-index of the depth of financial institutions — to Philippines, Romania and Uruguay; by sub-index of the depth of financial markets — to Pakistan, Indonesia and the Philippines. Along with these countries, Russia is among the leaders among the states of its cluster on these three sub-indexes.

Judging by the average values of sub-indexes for 2004–2014 for the countries belonging to the cluster "Junior partners", the lag of Russia does not seem dramatic. In sub-index of financial services coverage Russia is close to such countries as Croatia and Slovenia. [6]

Bank of Russia annually publishes results of monitoring of financial availability indicators,[24] and reviews of financial inclusion for adult population and subjects of SMB.[25]

At the same time, Russia is creating favorable conditions for the development of the financial services market. Penetration of modern ICT, such as the Internet and mobile communications, in Russia is above the world average, However, the capacity of information is often lower than in the most developed countries in this respect, although it is much more affordable for consumers.

Experts note the high saturation of the Russian mobile market. At the begging 2021, the number of users exceeded 228 million people, that is 1.5 times more than the population. At the same time, the use of services continues to grow. According to the Ministry of Digital Development, Communications and Mass Communications of the Russian Federation, in the Q1 of 2021, fixed Internet traffic in Russia added almost 43% compared to the same period of the previous year. The volume of mobile traffic in the same period increased by 37% — up to 6.7 billion Gb.

In the rating of quality and availability of the Internet Russia takes the 9th place out of 131 countries and territories, by the level of availability of mobile Internet — 2nd place among the 50 countries with the largest GDP. According to the Content-Review company, 1 Gb of data in 2020 cost Russians only 24.6 rubles. Cheaper mobile Internet only in India: 9.2 rubles for 1 Gb.[26]

At the same time, Russia has barriers to increasing financial inclusion for some population groups:

- physical (remote areas, persons with disabilities);
- social (low-income groups, self-employed, migrant workers, etc.);
- lack of competence and skills (elderly and poorly educated);
- SMB subjects (especially in the early stages of development).

Overcoming these barriers requires further development of adequate infrastructure, channels of access to digital financial services, also regulatory and technical measures to protect against operational risks of money, maintain the privacy and security of users, ensure their rights.

The leading role in this is played by regulators and financial market participants who develop and implement technology SupTech (Supervisory Technology) for monitor and supervise the financial market and detect misconduct, unfair sales practices and market manipulation, and RegTech technology (Regulatory Technology) for monitor fraud and money laundering and terrorist financing, assess and manage risk.[27]

In the field of cybersecurity, SupTech and RegTech technologies carry out automatic multi-factor identification according to the rules "knew your customer" (KYC) and compliance control, tracking the data transfer process, conducting analysis of the actions and

[24] URL: https://cbr.ru/Content/Document/File/124646/acc_indicators_29072021.pdf.

[25] URL: https://cbr.ru/Collection/Collection/File/25684/review_24122019.pdf.

[26] RBC. Russia entered the top ten rating of quality and availability of the Internet. URL: https://trends.rbc.ru/trends/social/cmrm/613eea0f9a7947a3178b11b.

[27] The main directions to development of technologies SupTech and RegTech for the period 2021–2023. URL: https://cbr.ru/Content/Document/File/120709/SupTech_RegTech_2021–2023.pdf

behavior of employees, as well as cyber training attacks to detect vulnerabilities.

In Russia, as in other countries, artificial intelligence, big data, neural networks, cloud computing, machine learning, robotic business processes and blockchain are used for this purpose.

Despite the fact that these technologies are actively used, their legislative implementation is too slow. In 2018, the Bank of Russia launched a special regulatory "sandbox" to test innovative financial technologies, products and services before establishing rules for the regulation of relations related to their application in the financial market. However, the legislative and executive authorities have a clear preference for regulation of banking and financial derivatives markets. It is important that legislators do not limit themselves to prohibitions, because of the cross-border nature of financial and regulatory technologies, there is a risk of offshoring the market for FinTech- and RegTech-services, which could lead to the loss of possible tax revenues to the country.[10]

In September 2021, the Bank of Russia developed a draft of priority directions for improving the availability of financial services in the Russian Federation for the period 2022–2024 to improve the physical and affordability of financial services for the public and business in a balanced manner, to improve their quality and to broaden their range, taking into account the digital transformation of the financial market. The following key tasks are identified:

- improving the physical and diversified availability of financial services through the development of online service channels for the public and business while reducing the risks of digital inequality and enhancing cybersecurity;
- expanding the opportunities to attract debt and equity financing for business.

To achieve these objectives, the Bank of Russia considers it necessary to focus separately on the following consumer groups:

- residents of remote, sparsely populated and inaccessible areas;
- persons with disabilities, older persons and other people with limited mobility;
- citizens with relatively low income;
- SMB subjects.[28]

In Russia, as in many other countries, developing based on ESG-principles responsible financing (RF), in particular become popular ESG bonds — sustainable bonds, social bonds and green bonds, as well as alternative and ethical investment. In our country 2–3 years ago the stage of transformation of ESG-principles into more specific requirements, indicators and regulatory standards began, for example, the Bank of Russia are developing a unified approach to assessment of ESG-risks in the financial market in 2021.

One of the eight key directions of financial market development for 2022 and 2023 and 2024. The Bank of Russia considers "expansion of the contribution of the financial market to the achievement of the goals of sustainable development and ESG-transformation of the Russian business". Motivates it so: "Movement of economies towards sustainable development and ESG-factors becomes a global trend, which needs to be adjusted and the Russian financial market". The Bank of Russia will raise awareness of sustainable development financing.

At the stage of launching the market of sustainable financing, the Government of the Russian Federation together with the Bank of Russia will develop proposals to stimulate it and increase the interest of participants, including through the provision of tax incentives, subsidies and State guarantees. The Bank of Russia will also promote the integration of ESG-factors into business-strategies and risk management of financial and non-financial organizations.[29]

[28] Priority directions for improving the availability of financial services in the Russian Federation for the period 2022–2024. Bank of Russia. 2021. URL: https://cbr.ru/Content/Document/File/126471/project_pnpdfu.pdf

[29] The main directions of development of the financial market of the Russian Federation for 2022 and the period 2023 and 2024. URL: https://cbr.ru/Content/Document/File/131005/onrfr_project_2021–11–19_key_messages.pdf

ESG-principles have become a new reality, their impact on business, especially financial services and investment decisions is growing rapidly and steadily Thus, by 2025, global assets of ESG, Bloomberg projecting, should exceed 53 trillion USD, which is more than a third of the 140.5 trillion USD in the projected global "assets under management" (AUM) — amount of assets managed on behalf of investors by various foundations, companies, brokers and individuals).[30]

In these circumstances, many Russian banks and companies are forced to implement ESG-principles that should guide their actions. This implies business model re-engineering, increased non-financial reporting, additional organizational and financial burden. Moscow Stock Exchange together with Russian Union of Industrialists and Entrepreneurs (RUIE), are calculated daily sustainability indices "Responsibility and Openness" and "Sustainability Vector" according to ten basic indicators since 2019.[31] On 1 December 2021, the heads of the 28 largest Russian companies formed the National ESG Alliance to promote the transition to a sustainable model of economic development.

An important role in the development of FI is played by improving financial literacy, which is now complemented by financial awareness — the ability to make informed financial decisions.

Among the essential prerequisites for the successful development of FinTech-industry and financial inclusion in our country can be noted the high level of penetration of the Internet and financial services, their accessibility to broad categories of the population, the growing financial literacy of the country's residents, as well as the creation of digital ecosystems and the presence of high-class IT-professionals in the labor market.

All this increases the scale of financial inclusion, increases demand, provides stable profitability and attractiveness of FinTech-industry. For our part, this increases the appetite for risky venture capital investments, leads to the emergence of new technologies and increases growth over the long term. Thus, the linking of the financial sector to the real economy for inclusive sustainable development is strengthened.

CONCLUSION

In view of the above, it may be noted that FinTech and financial inclusion have a significant impact on the development of the financial sector, which contributes to the implementation UN SDGs. Development of financial inclusion is recognized as a public good, as it benefits citizens and businesses in a variety of areas, it became a priority for achieving sustainable and inclusive growth at the beginning of the zero years.

At the same time, various parameters of financial inclusion may have different effects on sustained economic growth. Research shows that not all financial-sector deepening leads to faster economic growth. Overheated financial markets significantly increase risks and increase the probability of crises, for example, in a situation of "too much finance".

Avoiding such overheating requires a balanced development of the basic parameters of the financial system, and also regular assessment of the optimal level of development of the financial system, which can simultaneously provide both economic growth and stability.

At the same time, there should be regular monitoring of all possible risks to ensure that financial inclusion is too high at low entry barriers. Research to date, in which the exceptionally positive effects of rapid expansion of financial inclusion are shown, much more has been published than those that contain critical assessments of negative impacts and analysis of possible risks. The latter are still in little demand as they remain outside the mainstream.

The advent of digital platforms and ecosystems calls for new solutions to

[30] URL: https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum

[31] URL: https://fs.moex.com/f/15022/esg.pdf

the challenges of cybersecurity, privacy and personal data protection. The rapid development of FinTech increases cybersecurity risks. To solve these problems, need to be accelerated technology development and deployment SupTech and RegTech.

Russian authorities understand the importance of legal regulation of financial and regulatory technologies, which are already actively used by market participants. Strategy and plans are in place, but the pace of rulemaking is not in the interest of financial market participants. Balancing the interests of both financial service providers and consumers.

At the international level, the exchange of experience with the participation of Russia continues to improve financial systems and reduce the incidence of misbehavior by regulators, public and non-profit organizations in the implementation of the policy to improve access to financial services. There are still topical issues of development and optimization of the structure of the market of financial services and improvement of the system of FI indicators.

When developing a policy to implement UN SDGs and ESG-principles, the Government and the Bank of Russia should be paid attention to the shortage of specialists on sustainable development and ESG issues, as well as to the shortcomings of the Rosstat indicator system on this issue. There is also a need to ensure balanced development of responsible financing across the three directions: consumer protection, self-regulation of financial institutions and improvement of financial literacy of customers. It is very useful to accelerate the development of common rules of competition and business initiated by the Bank of Russia in order to reduce the risks of the process of monopolization of markets.

Further research may be related to the research of consumer behavior affecting the choice of services and financial institutions, as well as establishing a system of regular risk assessments as a result of the excessive increase in financial inclusion.

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A.V. Lopukhin — analysis of the Fintech industry impact on the achievement of inclusive sustainable growth and the implementation of ESG principles of responsible financing.
E.A. Plaksenkov — study of the relationship between financial inclusion and the level of the financial sector development in Russia and the world; assessment of the financial services market and barriers to its growth.
S.N. Silvestrov — development of the concept and general management of the writing of the article; formulation of the goals and objectives of the study.

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Business Processes Modelling of Crowdinvesting Platforms Based on Assets' Tokenization

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ABSTRACT

The rapid development of digital platforms, the formation of new business models of interaction between the economics agents, as well as the problem of increasing the efficiency of resources have generated the need to develop new approaches to the exchange of resources using modern digitalization opportunities. The purpose of our study is to develop models of business processes for the exchange of financial resources on crowdinvesting platforms using tokenization. The research subject is the economic relations between transactions on crowdinvesting platforms participants. The authors proposed a typology of business processes of crowdinvesting platforms, taking into account the type of transaction scenario (credit (closed) and speculative (opened)), which allows grouping the processes of exchange of financial assets allocated by the Cambridge Center for Alternative Finance. In addition, traditional models of financial assets exchange on a crowdinvesting platform are described. We proposed models of the exchange of financial assets on a crowdinvesting platform considering the tokenization process. Also, we substantiated that the tokenization will significantly increase the liquidity of over-the-counter securities, shares of non-public joint-stock companies, investments in real estate construction projects. The theoretical significance of the results obtained lies in expanding the theoretical and methodological basis for the development of the sharing economy in the financial area. The practical relevance of the proposed model is in the possibility of its application in improving the processes of exchanging financial resources on crowdinvesting platforms.

Keywords: crowdinvesting; digital platform; token; digital financial assets; modelling processes; sharing economy

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INTRODUCTION

The rapid development of digital technologies in modern society has created a powerful impetus for the expansion and growth of the diversity of economic relations. The changing landscape of credit and financial markets is a typical example of the extensive process of such transformation. The global expansion of digital devices, enhancing the role of civic initiatives and increasing their involvement in solving the problems of society as a whole and of individual groups, led to the establishment of new business models for collective investment based on the active interaction of small private investors and borrowers. [1, 2] Thus, the world financial system has embarked on a new round of infrastructural transformations, including the emergence of new types of market participants and new types of financial products, and also the emergence of new user scenarios in transactions of access to investment information and transactions.[1] Growing on the limits of traditional financial institutions, crowdinvesting platforms are rapidly forming their unique competitive position by creating new business models for customer service.

At the same time, the crowdfunding market in Russia is in its infancy.

The popularity of crowdfunding platforms is low on traditional credit and loan instruments, due to subjective high-risk assessment of potential investors, as well as a low level of confidence in the activities of investment platforms. This is due to the unavailability of full information on business projects on investment platforms, lower of awareness among potential investors and borrowers of the internal operation of investment platforms. [3] These issues are indeed common to some crowdinvesting platforms. Transparency in their operation would significantly reduce the risks identified.

The implementation of this process, in turn, is possible through the use of distributed registry technology (DLT). The use of this tool in relation to a wide range of assets is generally referred to as "asset tokenization", which implies the digital reflection of tangible and intangible assets in distributed registries as multiple digital units of accounting, i.e. tokens. [4] The possibility of splitting large and expensive (and therefore low-liquid) investment objects in the form of multiple low-cost tokens (tokenized assets, crypto assets) creates significant market infrastructure development potential for both borrowers and investors. [5, 6]

Applying the asset tokenization procedure to improve transactions on crowdinvesting platforms involves a preliminary modelling process. This transformation of business processes will allow investment platform operators to form a unique competitive position against the background of traditional financial institutions. In addition, the application of distributed registry technology unlocks the potential of technological solutions to create a new segment of the lending market, as well as contributing to the consumer value of collective investment. [7]

ASSET TOKENIZATION AS A TOOL FOR TRANSFORMING TRANSACTIONS ON A CROWDINVESTING PLATFORM

Tokenization — is the representation of traditional assets in the form of DLT-issued tokens. A token means a digital right to a resource. I. M. Konobeevskaya notes that "from a technological point of view, a token — is one of the miniature blocks in a blockchain system that can be used to

[1] The Global Alternative Finance Market Benchmarking Report. URL: https://www.jbs.cam.ac.uk/wp-content/uploads/2020/08/2020–04–22-ccaf-global-alternative-finance-market-benchmarking-report.pdf; The 2nd Global Alternative Finance Market Benchmarking Report. URL: https://www.jbs.cam.ac.uk/wp-content/uploads/2021/06/ccaf-2021–06-report-2nd-global-alternative-finance-benchmarking-study-report.pdf

secure various rights within the system". [8] D. A. Kornilov adds that "literally a token — is a key or access to identify its owner, secure remote access to information resources, etc." [9] However, the concepts of "token" and "tokenized assets" are not identical. If tokenized assets are real assets (for example, property in the form of buildings, structures, financial resources and property rights), the value of which is determined by their off-network economic turnover by blockchain, then cryptocurrency and ICO tokens — are the digital rights to the assets existing in the network of the blockchain, as their value is determined by their presence inside the network. [10] In the case of crowdinvesting, it is important to note that tokenization can be exercised with respect to any asset, and rights to it will be represented as a token, i.e. a link in a distributed registry. It follows from all of the above that tokenization as a technical innovation can significantly change the model of transaction implementation on the crowdinvesting platform, greatly minimizing the number of documents ensuring the security of the transaction.

The high potential of distributed registry technology to improve the performance of digital platforms is gradually forming the growth of interest in this topic, in both foreign and domestic literature. [11–14] J. Chod and E. Lyandres compare crowdfunding mechanism with venture financing. [15] In his work J. Li and W. Mann, and also Y. Bakos and H. Halaburda pay attention to the network effect and coordination of users of digital platforms P2P-investment. [16, 17] R. Fahlenbrach and M. Frattaroli research the behavior of ICO investors and show that they often sell their tokens in the secondary market, thus ensuring its attractiveness and liquidity. [18] A number of other papers are studied the determinants of ICO success and show a positive relationship with the amount of information disclosed to investors. [19, 20]

Practical mastering of opportunities to work with real assets and property rights in tokenized form, enables transactions to be arranged and property rights to be transferred and protected in more effective ways. In support of this thesis in the report for public consultations of the Central Bank of the Russian Federation "Development distributed ledger technologies" (December 2017) specified that the "selection of basic elements" (tokenization) ... will ensure the speed and ease of its (financial asset) transfer by owners or intermediaries". In addition, the report notes that "development of standards for distributed registry technology will help to reduce the costs of implementation and integration of different systems, ensure their compatibility and effective interoperability".[2]

On *Fig. 1* schematically presents the process of transferring property rights in traditional form (*fig. 1a*) and when using tokens (*fig. 1b*). Traditional procedure for verification of ownership of assets, documentary recording of changes, as well as verification and registration of ownership rights replaced by the process of tokenization of assets, which significantly simplifies the process of transferring property rights by reducing the number of intermediaries, increases the speed of transactions, and also makes the process more transparent.

Using tokenized assets as financial products carried out at crowdinvesting platforms, will contribute to the growth of their liquidity, the possibility of dividing the asset into separate tokens, transforming the pricing procedure, as well as reducing the cost and increasing the reliability of transactions.

[2] Report for public consultation "Development distributed ledger technologies". URL: https://cbr.ru/ Content/ Document/File/50678/ Consultation_Paper_171229(2).pdf

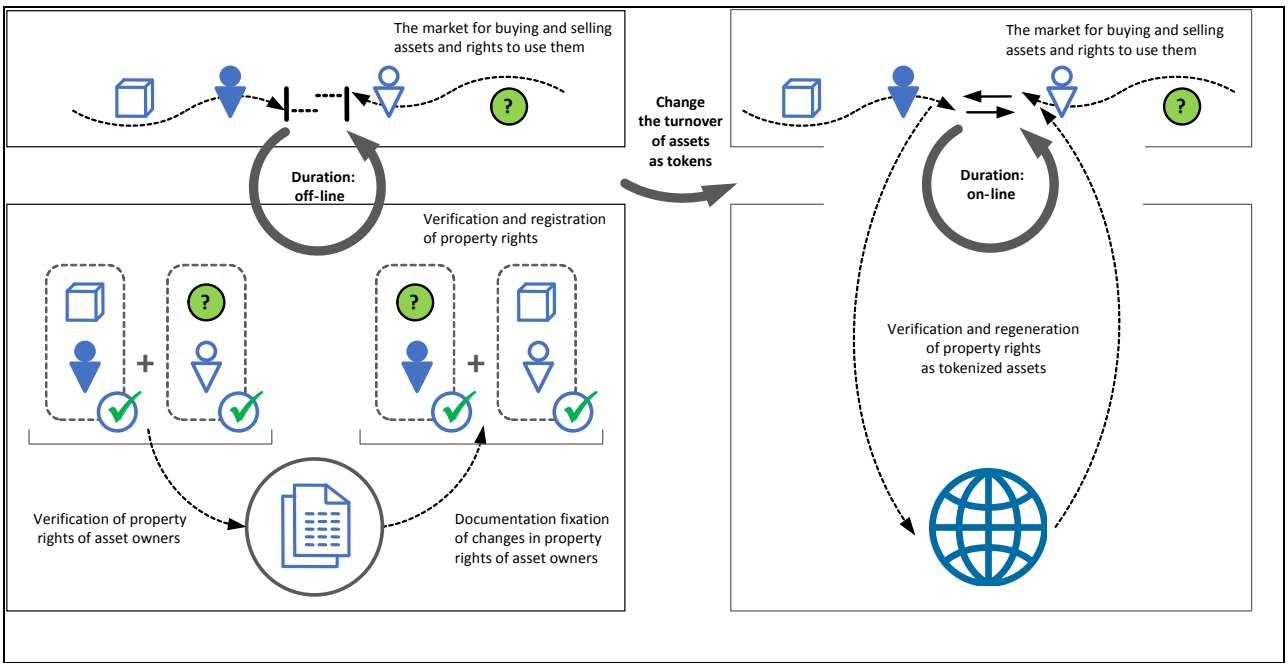

Fig. 1. **The scheme of purchase and sale of assets and the rights to use them in the traditional form and the form of tokenized assets**

Source: compiled by the authors.

CLASSIFICATION OF BUSINESS PROCESSES OF CROWDINVESTING PLATFORMS BASED ON ANALYSIS OF DIGITAL FINANCIAL ASSETS (DFA)

In the Federal Law of the Russian Federation from 31 July 2020 No. 259, regulatory framework for investment platforms, are used rather broad concepts such as "information system" and "information system operator", interpreted in values, defined by the Federal Law from 27 July 2006 No. 149 "On Information Technologies and Information Protection". The investment platform operator can only be a Russian legal entity and only after inclusion of its Bank of Russia in the "Register of Information Systems Operators" (par. 1 art. 5).

To analyze the diverse business practices of information system operators, where digital financial assets are produced and managed, it is advisable to pre-typologize the existing processes on crowdinvesting platforms and consider their implementation features, taking into account the tokenization of assets.

In the analytical documents of the Central Bank of Russia, crowdinvestment operations are classified according to the composition of their participants[3]: P2P — lending to individuals of other persons; P2B — lending by individuals to small and medium-sized companies; B 2B — lending of legal entities or individual entrepreneurs by legal entities or other individual entrepreneurs.

A more detailed typology of the business models used in collective investment is presented in the reports of the Cambridge Center for Alternative Finance 2020 and 2021 years.[4] This typology includes the

[3] The crowdfunding market doubled in 2017. URL: http://www.cbr.ru/press/event/?id= 1902#highlight=краудфандинга

[4] The Global Alternative Finance Market Benchmarking Report. URL: https://www.jbs.cam.ac.uk/wp-content/uploads/2020/08/2020–04–22-ccaf-global-alternative-finance-market-benchmarking-report.pdf; The 2nd Global Alternative Finance Market Benchmarking Report. URL: https://www.jbs.cam.ac.uk/wp-content/uploads/2021/06/ccaf-2021–06-report-2nd-global-alternative-finance-benchmarking-study-report.pdf

allocation of all investment models into 6 groups and 9 types (*table 1*).

Criteria such as the type of assets to be invested, the type of investor and the degree of the platform's involvement in the investment process are used as a classification principle.

P2P-investment (Peer-to-peer) — is a way to attract investment in the form of a secured or unsecured loan from a group of private or institutional investors by an individual or business entity. Currently, this method is the most common in terms of attracting collective investment through investment (crowdinvesting) platforms, in which the risk of loan default is assumed by the investor. The investment platform does not accept the default risk of a loan, but can perform the functions of loan default risk assessment and work on arrears.

Within **balance sheet lending**, Unlike direct investment, a digital platform operator provides a loan directly to an individual or entrepreneur from funds held on the operator's own balance sheet, at the same time, the risks of loan default are borne by the platform operator himself.

Buyout of accounts receivable (invoice trading) is a type of alternative investment, which is used as a receivables management tool and is an alternative to traditional factoring.

Purchase of OTC securities (debt-based securities) — is the business of digital platforms, providing individuals and/or institutional investors with the opportunity to purchase debt securities, bonds or fixed interest rate debt. In the traditional sense, the over-the-counter market — is a tool for experienced investors who are dissatisfied with the terms of the deal or the set of instruments they can get on the stock exchange. In the over-the-counter market, investors can deal with various types of assets: from shares to all kinds of bonds, derivatives and structural products. Despite the low relative share of the global market, statistics on crowdinvesting platforms show strong demand and growth for this type of financial assets. For example, platforms in the USA and Canada demonstrated a high rate of growth in institutional OTC funding in 2019 (74%) and 2020 (98%).

Purchase of shares of non-public joint stock companies (equity-based crowdfunding) is the type of equity investment, off-exchange, or securities issued by young start-up companies. From the point of view of risky investments, the purchase of shares of companies that are not yet on the stock exchange is profitable. This is due to the fact that the growth of private companies exceeds the growth of public. In particular, the growth rate of transactions for this type of investment in 2019 was 27%, or 1.09 billion USD; and 2020 was — 35%, or 1,52 billion USD,[5] which indicates a growing interest in this group of financial assets.

Investment in real estate projects (real estate crowdfunding) — operation of digital platforms that enable individuals and/or institutional investors to buy a stake in a real estate project. Placement of equity investment offers gives potential investors a more convenient and liquid instrument for investments than with the expensive purchase of a separate property and certainly has significant growth potential. [24] In recent years, real estate crowdfunding has shown a 71% growth rate of 2.87 billion USD, in 2019 and by 63%, or 2.77 billion USD in 2020.[6]

The data presented in the analytical reports of the Cambridge Center for Alternative Finance in 2020 and 2021 also allow to assess the degree of popularity of different business models of crowdinvestment (*fig. 2*).

[5] The 2nd Global Alternative Finance Market Benchmarking Report, Cambridge, UK, Cambridge Centre for Alternative Finance. URL: https://www.jbs.cam.ac.uk/wp-content/uploads/2021/06/ccaf-2021–06-report-2nd-global-alternative-finance-benchmarking-study-report.pdf

[6] See ibid.

Table 1

Typology of crowdinvesting models and related processes

Classification of crowdfunding models	Essence business process actor interactions	World market volume in 2018, bln USD	World market volume in 2020, bln USD
1. P2P- investment 1.1. P2P- personal loans 1.2. P2P- business entity loans 1.3. P2P- loans to individuals or business entities secured by real estate	1.1. Private and/or institutional investors provide loans to individuals	195	34.740
	1.2. Private and/or institutional investors provide loans to business entities	50	15.374
	1.3. Private and/or institutional investors provide loans secured by real estate to individuals or business entities	6	3.1
2. Lending from the digital platform balance account (Balance Sheet Lending) 2.1. Personal loans 2.2. Business entity loans 2.3. Loans to individuals or business entities secured by real estate	2.1. Digital platform operator provides loans to individuals from funds attracted from private and institutional investors	10	13.025
	2.2. Digital platform operator provides loans to business entities funds attracted from private and institutional investors	21	28.018
	2.3. Digital platform operator provides loans secured by real estate to individuals or business entities from funds attracted from private and institutional investors	11	1.808
3. Buyout of accounts receivable (Invoice Trading)	3. Private and/or institutional investors buyout accounts receivable from an entrepreneur at a discount	3.2	3.882
4. Purchase of OTC securities (Debt-based Securities) 4.1. Debt securities 4.2. Corporate bonds (Mini Bonds)	4.1. Private and/or institutional investors buy debt securities from an entrepreneur, generally bonds with a fixed interest rate	0.852	0.384
	4.2. Private and/or institutional investors buy debt securities from an entrepreneur, generally corporate bonds, with a fixed interest rate	1.333	0.043
5. Purchase of shares of non-public joint stock companies (Equity-based Crowdfunding) [21, 22]	5. Private and/or institutional investors buy shares of an entrepreneur	1.515	1.52
6. Collective investment in the construction of real estate (Real Estate Crowdfunding) [23]	6. Private and/or institutional investors provide loans to business entities	2.959	2.777
Total		302.859	104.671

Source: compiled by the authors based on The 2nd Global Alternative Finance Market Benchmarking Report.

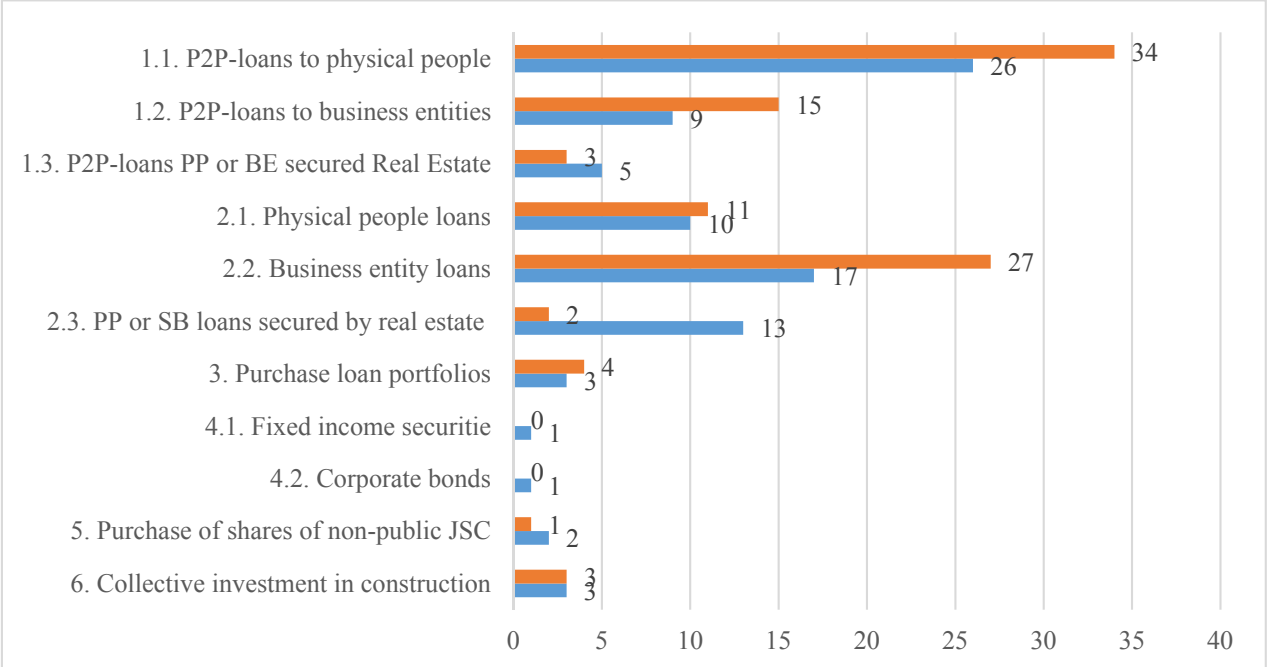

Fig. 2. **Dynamics of the shares of the global crowd investment market for different business models, 2018 and 2020**

Source: The Global Alternative Finance Market Benchmarking Report.

From the analysis of *fig. 2* it follows that the business model of consumer P2P-lending has remained the largest financing model ever since 2013, although it faced a significant fall in absolute volume in 2019 and 2020. In considering at the dynamics of the 2018 and 2020 market shares between individual business models (see *fig. 2*), there are two different trends. Largest share change — this is the downward trend in turnover in the business model "loans provided by the crowdlending platform under the mortgage of real estate" (2.3). The growth trend can be seen in models of lending to business entities (1.2. и 2.2), which indicates an increase in the use of crowdfunding in business practices.

Different investor remuneration principles are used as a criterion for different business models in different crowdfunding projects: as a share in an investment project or return financing, similar to a bank loan. [25]

However, from our point of view, considering the issue of modeling business processes of crowdinvesting platforms, it is advisable to use as a typological feature the difference in types of tokenized assets or DFA, which is much closer to the terminology of the Federal Act from 31 July 2020 No. 259. Such a focus would directly address, how the internal working mechanisms of the crowdinvesting platform are being transformed in the organization of DFA turnover.

METHODOLOGY OF THE RESEARCH

As described earlier, there are several different approaches to classifying the business processes of crowdinvesting platforms in scientific literature and practice: taking into account the participants of transactions [2], the objects of investments, as well as multi-level and multi-criteria systems, combining several classification principles (differentiating participants, objects of investment and roles of different participants of investment transactions).

Table 2

Models' classification according to basic transaction scenarios

Scenario type	Business processes for crowdinvesting platforms that match this scenario
Credit (closed) investment scenario	1. Direct investment (P2P/Marketplace Lending) 2. Credit from the digital platform balance account (Balance Sheet Lending) 3. Buyout of accounts receivable (Invoice Trading)
Speculative (open) investment scenario	4. Purchase of OTC securities (Debt-based Securities) 5. Purchase of shares of non-public JSC (Equity-based Crowdfunding) 6. Collective investment in the construction of real estate (Real Estate Crowdfunding)

Source: compiled by the authors.

In the framework of this research, it is proposed to apply the synthesis method, combining the identified processes of crowdinvesting platforms in two groups. This is because tokenization unifies and impersonates the nature of the underlying asset to the level of monetary claims and the ability to exercise economic rights. It is important to note that this is how the classification of digital rights in the Federal Law from 31 July 2020 No. 259. In accordance with this synthesis, it is proposed to consider the classification of business processes of turnover of tokenized assets with differentiation of two base scenarios of transactions:

Credit investment scenario — closed transaction scenario between lender and borrower by trajectory "loan granting — loan repayment". It is close to classical lending, where the economic interest of the lender is based on the expectation of gain loan income.

Speculative investment scenario — open multiple transaction scenario between multiple buyers and sellers. It is close to speculation and the use of an asset as a means of accumulation, when the economic interest of the buyer of the asset is based on the expectation of a speculative return from the resale.

Accordingly, the crowdfunding business model scenarios were divided into two groups (*table 2*).

Since tokenization unifies and depersonalizes the nature of the underlying asset, conditions are created to organize liquidity turnover of tokenized assets in the secondary market. In other words, part of the transactions in the closed or credit investment scenario may migrate to the public speculative cash flow of claims through resale of claims rights in the secondary market. This possibility, however, does not eliminate the differences in the typology presented, because the economic interest in obtaining a loan or speculative income will in any event be realized at one stage of resale of the asset.

To address the challenge of designing a mechanism for crowdinvesting platforms based on the turnover of tokenized assets was applied business process and notation BPMN-2 (Business Process Model and Notation). Notation BPMN-2 currently used to describe lower-level processes using diagrams illustrating the process execution algorithm. The diagrams schematically identify events, performers, material and documentary flows accompanying the process. The business process description language is based on the following basic

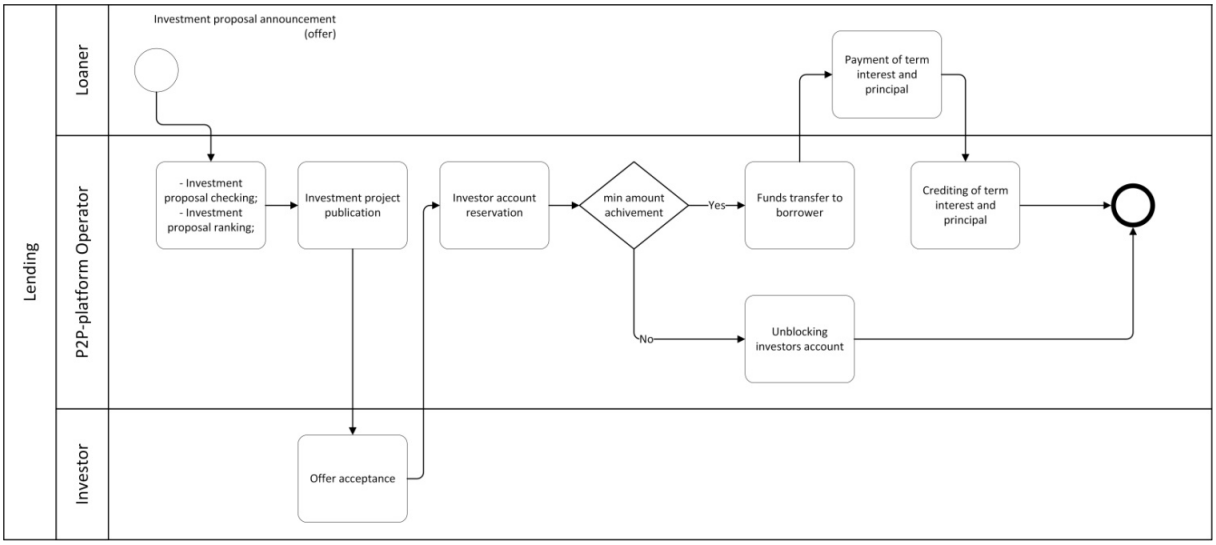

Fig. 3. **The traditional business model of a loan on a crowdinvesting platform**

Source: compiled by the authors.

objects: event; activity; gateway; flow; date; artefact; swimline; pool.

The choice of description and design method in favor of BPMN is based on the universality and prevalence of this approach. To date it is one of the widely used approaches to business process description both among business users and as a basis for business model software products. Schematics of this notation is a standard language of description also for creation of executable algorithms in the sphere of business management. The key factor in choosing BPMN-2 for this article was the opportunity to visualize how the roles are being transformed roles and specific actions of participants in the crowdinvesting platform in the organization of movement of tokenized assets or DFA.

The actual procedure of the research included two main stages. In the first phase, after the preliminary systematization of the processes mentioned above, the existing models of transactions on crowdinvesting platforms were described (the so-called "as is"). In the second phase, transaction processes were described with regard to tokenization within each group.

BUSINESS PROCESS MODEL DEVELOPMENT BASED ON ASSET TOKENIZATION

Modeling business processes of crowdinvesting platforms closed investment scenario

In closed investment case business models was included direct investment (P2P/marketplace lending), credit from the digital platform balance account (balance sheet lending) and buyout of accounts receivable (invoice trading). In the practice of crowdfunding platforms 1–3 types (P2P/Marketplace Lending, Balance Sheet Lending and Invoice Trading) the basic business process functions according to the logic of the loan (*fig. 3*), which leads to the need to conclude a contractual relationship between the parties. Due to the fact that borrowing is not carried out in a bank, and on a crowdinvesting platform, the scheme is typical for a credit (closed) investment scenario. Platform functionality allows investors to independently determine the size of the buyout "share" in the project, and thus, even without the use of tokens, provides a pseudo-discrete representation of the asset to many small investors.

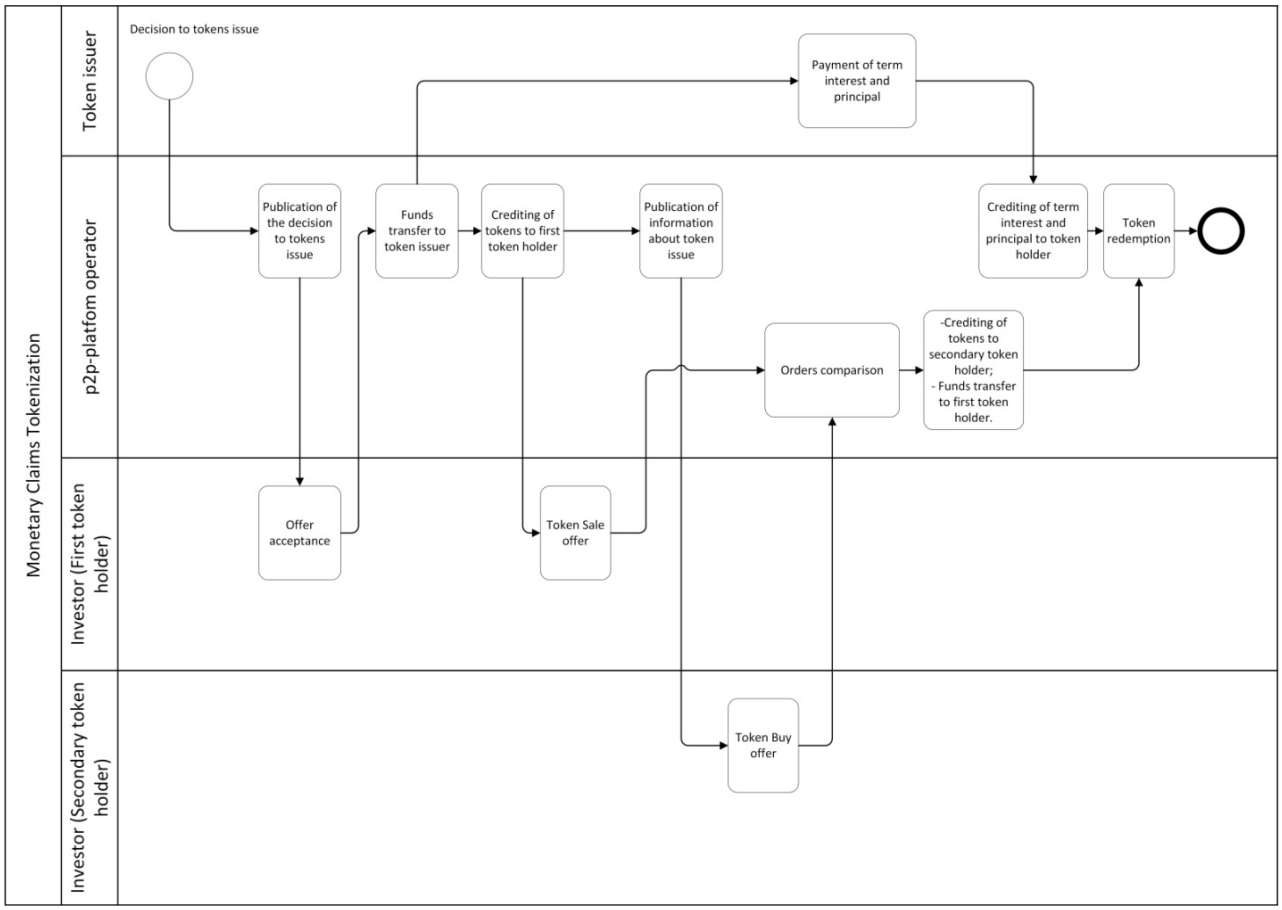

Fig. 4. **Transformation of the business model of a loan on a crowdinvesting platform in the form of placement of digital financial assets**

Source: compiled by the authors.

The benefits of asset tokenization include the simplicity, speed and security of token transactions on the DLT network, where there is an unhindered possibility of debt moving beyond the closed investment scenario. In other words, it is the possibility of trading monetary claims in the form of digital rights in the secondary market.

In the traditional business model of a loan on a crowdfunding platform, in case of an investor need to sell existing liabilities, the borrower will require a new contract while waiting for a refund and appropriate registration by platform and government regulators. These restrictions hinder the formation of a mass secondary market in relation to concluded loan transactions. This limitation can be neutralized by placing investment offers from borrowers in the form of digital financial assets, i.e. by tokenizing assets (*fig. 4*).

Digital platforms move to transactions in the form of tokenized or digital financial assets (DFA) will realize a number of advantages essential for the growth of market size and liquidity. Increased transparency and reduced risk in the exchange of financial assets on crowdlending platforms as a result of the tokenization process will increase the growth of both borrowers and lenders, will also contribute to the spread of various business models of crowdfunding. All this will result in a balance between supply and demand and an improved pricing mechanism.

Simplicity and absence of time delays will allow the formation of a secondary market,

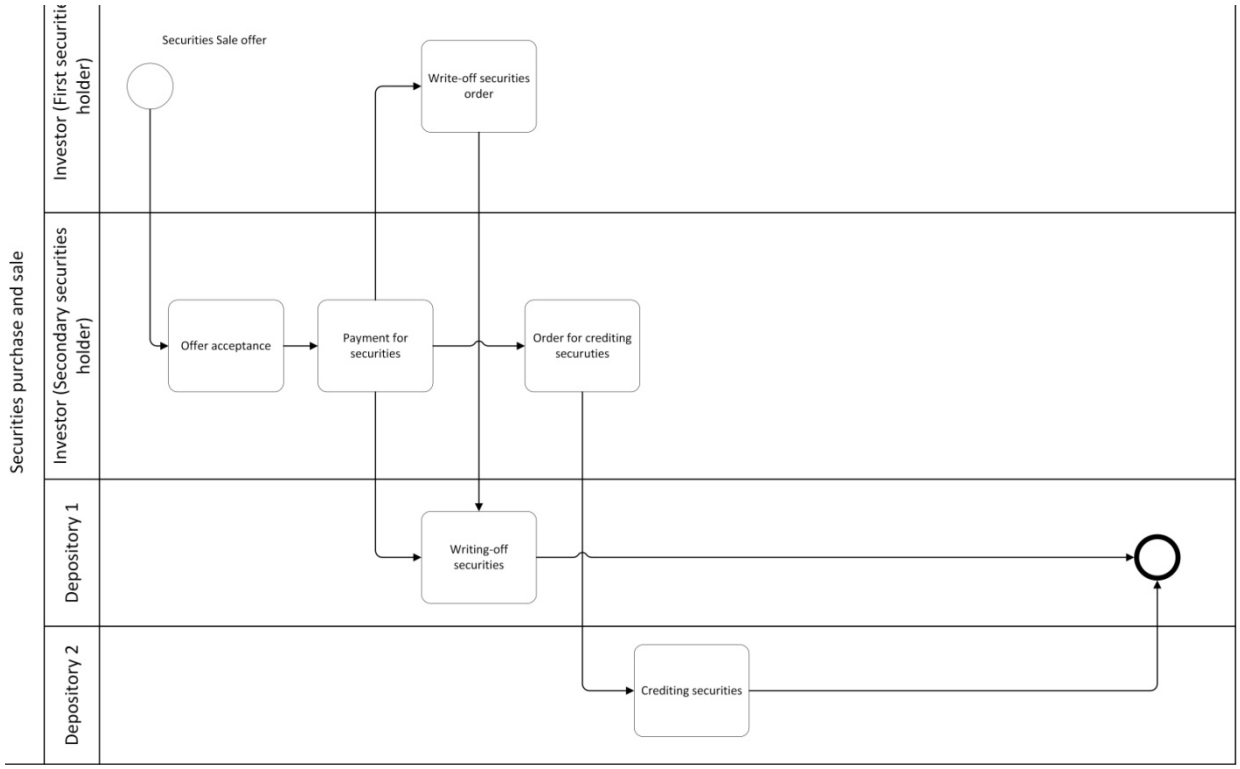

Fig. 5. **The traditional business model of buying and selling securities**

Source: compiled by the authors.

which, in turn, will make the DFA market accessible to more investors and speculators who invest for a short period.

Thus, tokenization of assets in closed investment scenario business models should produce the following effects. First, increase the number and volume of market transactions by reducing transaction costs online. Second, to provide opportunities to transform a closed investment scenario into an open. That is, tokenization is a technological solution to increase the liquidity of assets through the ability to resell digital rights of cash claims in the secondary market.

Modeling business processes of open investment scenario crowdinvesting platforms

On the business model of over-the-counter securities purchase (Debt-based Securities), purchase of shares of non-public joint-stock companies (Equity-based Crowdfunding), investment in real estate projects (Real Estate Crowdfunding) account for 8% of the global market turnover of crowdinvesting platforms 2018 and 2020.

In the proposed typology of crowdinvesting processes, we attribute these models to a speculative or open investment scenario, where the closest analogy from the usual practice of investing is the purchase of shares of public companies. The low turnover of these crowdinvesting models indirectly indicates a lack of attractiveness of its internal structure, small interest of market participants, thus forming a request to increase liquidity and transparency of its functioning. In other words, this investment scenario requires open access to a broad secondary market, which implies strong growth within individual business models.

The general logic of the platforms in these business models is described as the purchase and sale of securities and the rights to receive income from securities in the form of dividends or other type of investment remuneration (*fig. 5*). At the same time, traditional securities turnover

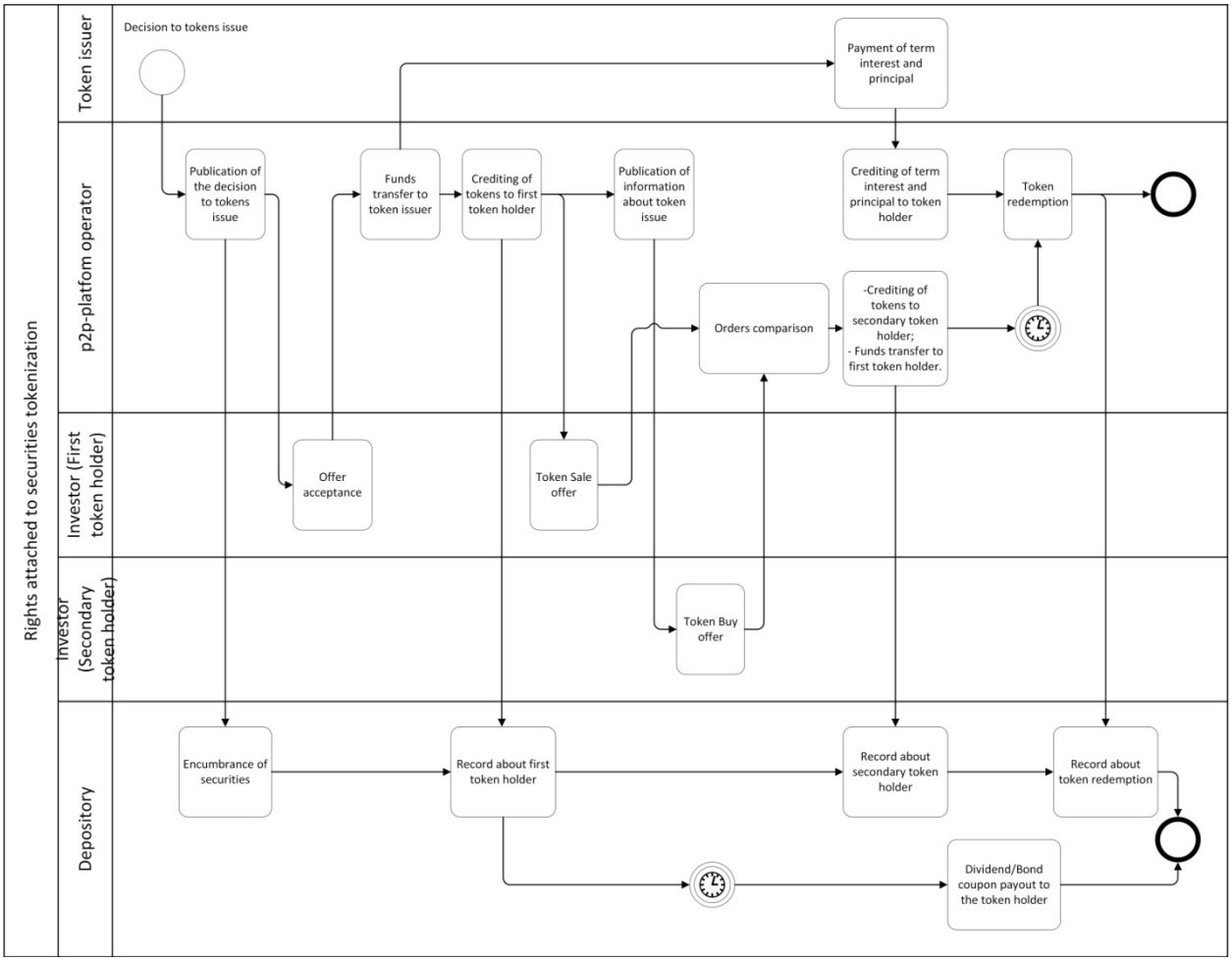

Fig. 6. **The business model of tokenization of rights, including the possibility of exercising rights under securities**

Source: compiled by the author.

formats demonstrate the dependence on the speed of performing the functions of the depository, especially in the case of the purchase of over-the-counter securities or shares of non-public joint-stock companies.

Accommodation digital financial assets on the crowdinvesting platform will increase the turnover rate and put transaction in online mode. In this format, the DFA market for business models of over-the-counter securities purchases. In this format, the DFA market for business models of over-the-counter securities purchases (Debt-based Securities), shares of non-public joint-stock companies (Equity-based Crowdfunding) and investments in real estate projects will approach the stock and currency market (*fig. 6, 7*).

Implementation of a business model for the purchase and sale of securities in the form of tokenization of rights, including the enforceability of securities rights (see *fig. 6*) and tokenization of rights to transfer securities (see *fig. 7*) leads to increased complexity of the digital platform due to additional functions, which, in the traditional business model, are implemented by the registrar and depository. Within this functionality, the digital platform implements securities depository accounting, including information on first and subsequent owners, dividends and coupon income, and DFA repayment data. At the same time, from the point of view of users (investors), performing registration functions and tokenized assets on the DLT

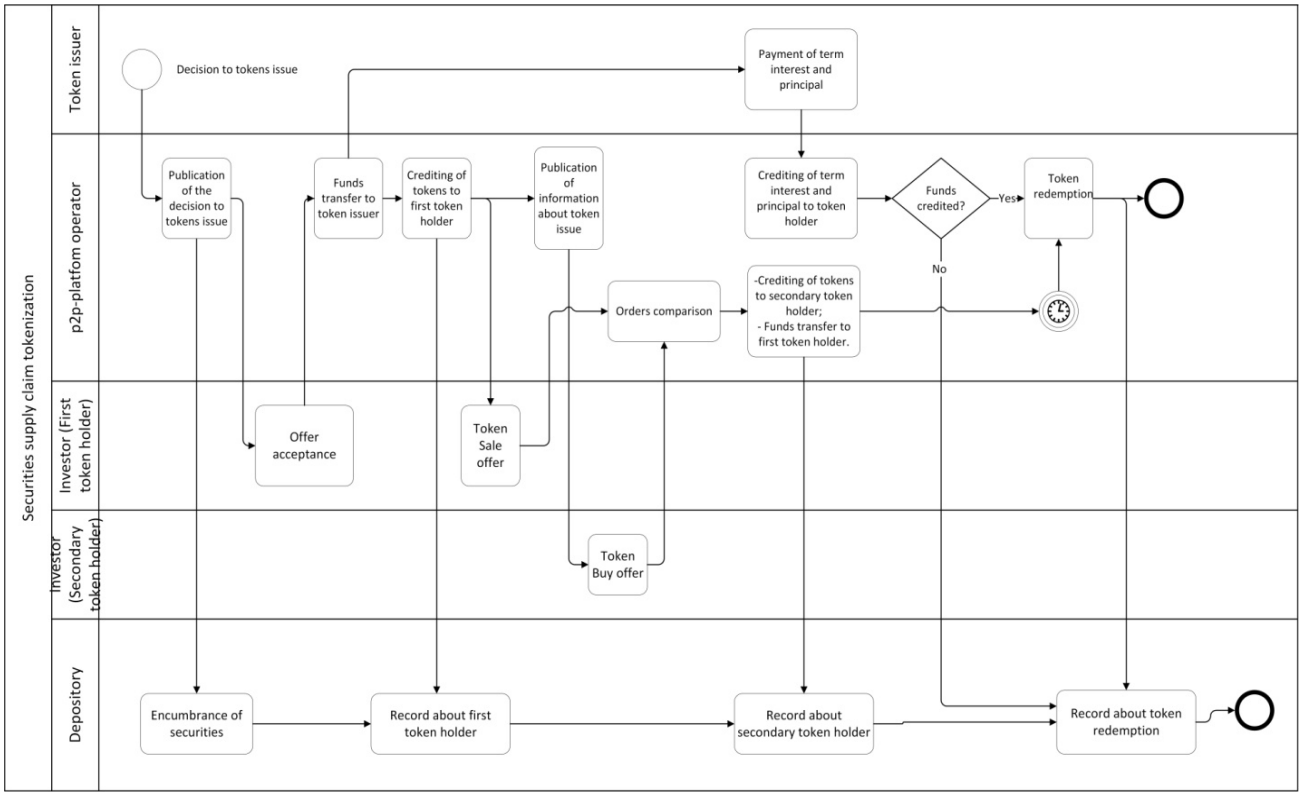

Fig. 7. **The business model of tokenization of rights of the claim for transfer of securities**

Source: compiled by the authors.

network have a significant advantage as distributed registry data cannot be deleted or edited. Thus, turnover of tokenized assets for open investment scenario business models provides real access of the asset to the secondary market and a significant reduction in transaction costs when the crowdinvesting platform performs the functions of registrar and depository.

DISCUSSION OF THE RESULTS

With regard to forecasts and prospects for business processes based on asset tokenization it can be assumed, that the use of digital financial assets in the future will lead to the abandonment of the classic IPO (Initial Public Offering) on the exchange. The issuance of tokenized shares and other DFA will allow the business to attract the necessary financing, and investors will have at their disposal a security that allows to receive investment and dividend income with the possibility of realization in the secondary market. Analyzing practical aspects of the activity on the basis of the business models presented above, it is possible to highlight a number of advantages and disadvantages of the turnover of tokenized assets.

The main contradiction of the implementation of asset tokenization on crowdlanding platforms is that, on the one hand, this technology improves the liquidity of financial assets, on the other hand,— the limitation of trade in tokenized assets constrains the development of this technology with collective investment. However, it will unlock significant amounts of money that are illiquid and not available to the broad market. Development of primary and secondary markets for such assets, increasing transparency in the exchange of financial assets through digitalization of the process will help build confidence in crowdfunding platforms, which will provide a cash flow, more

transparent pricing, and increase the growth of the collective investment market.

However, the realization of such effects requires both regular demand and supply. Level of readiness of potential investors and asset owners to interact on the crowdinvesting platform, as well as the appropriate market infrastructure, are crucial factors in the development of the crypto market. It follows that business models of digital platforms on the turnover of tokenized assets can be complementary, rather than an evolutionary substitute for existing traditional markets.

It is important to note that the proposed models of business processes of collective investment using tokenized assets can be implemented in different variations, depending on whether or not the loan is secured, how the investor's remuneration is calculated and paid, and the manner and duration of the loan repayment. Of high potential interest are the possibilities of development of these models when the users of crowdinvesting platforms interact through the organization of the secondary market. It is especially worth noting the prospects for the development of a liquid and investor-accessible DFA market for such low-liquid assets, as real estate, art objects, shares of non-public companies, over-the-counter securities and debt obligations.

Application of DLT technology creates opportunities for the regulator in terms of transaction monitoring, identification of participants and parameters of transactions with tokenized assets. In the long run, one can consider extending the use of cryptocurrencies (on par with fiat currencies) to purchase DFA. The absence of such barriers will provide opportunities for private investors and speculators at the level of institutional investors and professional traders. The presented models of business processes can be used for development of existing and future crowdinvesting platforms of local and global investment markets.

The theoretical significance of the obtained results lies in the formation of the basis for the development of the economy of common use in relation to financial resources. The practical significance of the proposed model consists in the possibility of its application in improving the processes of exchange of financial resources on crowdlanding platforms.

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The Architecture of Labour Relations in Socio-Economic Ecosystems*

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ABSTRACT

The article presents a conceptual approach to the formation and development of labour relations in the context of socio-economic systems. The author shows that ecosystems as integrated organizational and economic structures, which developed intra-industry and inter-industry cooperative ties characterize functioning, consisting mainly of intelligent firms. In this regard, ecosystem management should be carried out not by directive methods, as in traditional business structures, but based on participatory governance and self-government principles, which also affects the specifics of human resource management. The author formulated the top-priority management tasks in the field of increasing the intellectual potential of ecosystem workers and methods for increasing the loyalty and involvement of personnel and highlighted the problems of labour relations arising in the conditions of ecosystem employment.

Keywords: ecosystem; systems economic theory; labour relations; digitalization; meso-economics; firm intelligence; employee self-management; participatory management

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INTRODUCTION

Integrated forms of economic activity, such as socio-economic ecosystems, forming coherent technological habitats of interacting organizations, have been actively developed in recent years. This was made possible by the widespread digitization of various aspects of production and the economy, and the impact of digital technology on all areas of society. One of the key characteristics of the ecosystem as a form of production organization is the use of technologies that determining change not only market segments, in which companies have historically operated, but also in areas of the economy that are outside these sectors. [1] It should be noted however that the effectiveness of digitization depends on the initial readiness of companies to introduce such technologies. [2]

The ecosystem business model emerged in the digitalization of the economy through the search for new business models based on big data analysis and the use of artificial intelligence. Many traditional companies have moved to the ecosystem model in the process of digital transformation, as well as technology startups. The vast majority of bigtech-companies also went on this ways of development by building around themselves global ecosystems of products and services. Today, Chinese and American companies have made significant progress in building ecosystems. Among them are the leading technology giants such as Alibaba, Tencent, Facebook, Google, Amazon, Apple, etc. Among the Russian ecosystem companies can be identified Sber, Tinkoff, Mail.ru Group, Yandex, MTS, etc.

McKinsey experts estimate that by 2025, socio-economic ecosystems will account for about 30% of global GDP. [3] Such ecosystems will be based on 12 fundamental human and business needs: mobility, housing, health, education, digital content, public services, travel, welfare and security, global corporate services (transnational transport services), B2B services (legal and accounting services), B2B market places (purchase of equipment), B2C market places (logistics, consumer goods). Accordingly, the digitalization process is also transforming the business environment, establishing ample opportunities for integrating economic actors in the form of ecosystems.

In fact, the term "ecosystem" is borrowed from biology, where it is defined as a habitat in which organisms are joined together by a stable network of connections. The prefix "eco-" describes the environment of the organization, and the "system" — the set of connected parts functioning as a single whole. The essence of the socio-economic ecosystem consists in the features of interaction of its elements. [4] We will rely on the provisions of the system economic theory of G. B. Kleiner, considering the socio-economic ecosystem as "spatially localized complex of uncontrolled hierarchical organizations, business processes, innovative projects and infrastructure systems, interacting with each other in the creation and circulation of material and symbolic goods and values, capable of long-term independent functioning at the expense of the circulation of these goods and systems". [5]

The purpose of this article — to determine the conceptual basis of labour relations formed in socio-economic ecosystems.

The hypothesis of the research is that, under the influence of digitalization, there is a transformation of labour relations in the ecosystems themselves, which is the development of intelligent firms with a highly participatory management culture.

The novelty of the article is that it deals for the first time with labour relations in the context of ecosystem development from the perspective of the theory of an intellectual firm.

ECOSYSTEM APPROACH TO THE ORGANIZATION OF ECONOMIC ACTIVITIES

Recently, the phenomenon of the socio-economic ecosystem has been growing,

that actualizes the problem of theoretical substantiation of the ecosystem concept, as well as forefront the "ecosystem management". [6]

M. Jansiti and R. Levine define ecosystems as "free networks of suppliers, distributors, outsourcing companies, production of related products and services, technology providers and many other organizations that influence the creation and implementation of the company's own proposals". [7]

O. Valdés de León proposes to define ecosystems as "networks of interacting organizations that have a digital and modular structure and influence each other's proposals". [8]

The ecosystem as an object of economic-management research consists of exogenously specified components of the environment and agents (actors), which act together endogenously as a system, benefiting from interconnectivity. [9] This approach is presented, for example, in a recent work by Chinese economists, describing China's industrial production ecosystem as integrating industrial entrepreneurship, industrial engineering, and industrial ecology.[10]

Although research on ecosystems is only gaining momentum, several empirical works can be distinguished in the economic literature, showing how ecosystems contribute to entrepreneurship and meso-economy. According to these researches, firms in ecosystems are more innovative and more technologically diversified than traditional forms of management. [11] Ecosystems are an essential tool for creating a sustainable economy based on entrepreneurial innovation.

The particularity of the ecosystem approach is its meso-economic focus on how ecosystems can cover a wide range of organizations and institutional factors, relevant to research on entrepreneurship at the local, regional and possibly even national level. [12] In this context, an ecosystem is defined as "a set of interdependent actors and factors coordinated in such a way that they ensure productive entrepreneurship in a particular territory". [4]

In article [13] the authors argue that any socio-economic ecosystem is largely composed of knowledge ecosystem subjects and business ecosystem entities, with the State acting as an intermediary. Subjects in the knowledge ecosystem are represented by universities and research organizations and play a central role in human capital development and technological innovation. Business ecosystem subjects are both large and small-established firms that use knowledge and innovation for industrial and commercial purposes.

SPECIFICITY OF MANAGEMENT RELATIONS IN THE SOCIO-ECONOMIC ECOSYSTEM

Of particular interest are the specific management relationships that arise in the socio-economic ecosystem. Originality of this management relationship is due to a number of circumstances, defined as the special role of ecosystems of large integrated business in the economy, and the complexity of consolidated object-subject interaction in the regulation of joint activities:

- special proximity of socio-economic ecosystems to the macro-level of the economy and civil society institutions, which is determined by the large scale of ecosystem business, its strategic role in the labor market;
- appearance of special, unique ecosystem grouping, management tasks, functions and works, related to the consolidation of information, financial and material flows between enterprises-members involved in coordinated joint activities; formation of ecosystem mission, brand, performance standards within a single ecosystem structure; assessment and enhancement of synergies between different actors;
- the need to take interdisciplinary and interregional factors into account in identifying and implementing solutions, as a consequence — the membership of ecosystem participants in various sectoral spheres and

territorial entities. From here — especially high requirements to the competence of ecosystem personnel, the organization of activities of the corporate coordinating center in the context of a variety of structures and methods of interaction, the ability to integrate a variety of organizational and managerial cultures;

• a high degree of economic and social responsibility of the ecosystem, which is associated with participation in large-scale business projects, generating innovation, often affecting national economic security as well as the effective employment of millions of people.

How do we see, integrated structures such as socio-economic ecosystems have special features of all elements of corporate governance. [14] This integration specificity is applied both to individual characteristics of management activities in corporate associations and to collective economic behavior of ecosystem participants. Performing, due to the scale of business, meso-economic role, socio-economic ecosystems as integrated corporate structures form a cross-sectoral identity, has common corporate interests and values. In this context we cannot agree A. A. Kobylko, who claim that ecosystem companies are intersectoral structures. [15] In other words, ecosystems are integrated organizational and economic structures, the functioning of which is characterized by developed intra-sectoral and inter-sectoral cooperative links.

With the increasing complexity of business models and the socio-economic environment as a whole, the significance of issues of effective personnel management in the formation of competitiveness and competitive-sustainability of economic entities becomes increasingly apparent. The qualitative and quantitative characteristics of human capital in socio-economic ecosystems have a direct impact on all key economic and financial performance indicators. In the publication [16] talks about the functioning of the ecosystem due to the modularity of the structure, which provides interaction of its elements and development of "collective solutions".

In recent decades, the interest in economic science and practice has not diminished to research and study of new labour management systems, processes of organization of the system of professional education, factors of development and formation of key competencies and conditions of reproduction of human capital, the implementation of social and labour relations in the new economic environment. Management styles, approaches to labour management and labour relations in general are transformed in the age of ecosystem formation.

Authors of the monograph "Ecosystems in the space of the new economy" [17] emphasize the following principles of management of work in ecosystems:

1) the hierarchy is flatter, then disappears;

2) the reassessment of management goals occurs in accordance with new tasks, technologies, innovations;

3) is constantly adapting to new changes;

4) the labour administration is carried out of project, flexible, based on individual needs;

5) the role of creativity is increasing;

6) the institution of self-government is being strengthened.

Thus, cognitive technology development, knowledge management systems, accessible educational trajectories in the digital economy, finding the most effective and efficient personnel-technologies, influencing labour management in modern conditions to mitigate the ongoing transformation processes in socio-economic ecosystems, are becomes more important.

It should be pointed out, that effectiveness of an ecosystem depends to a large extent on its ability to maintain social dialogue as a constructive way of integrating the personal goals of staff into the overall goals of the organization. The constant participation of employees in the social dialogue is beneficial

for the ecosystem, as it contributes to the development of a favorable moral and psychological climate, generate innovation, build trust among participants and as consequence — achieving efficient economic performance of the socio-economic ecosystem.

A number of researchers note one of the key differences between ecosystem management and enterprise management — it cannot be prescriptive. Fully, mature ecosystem should not be characterized by a hierarchical management system. At present, social and labour relations are also being transformed under the influence of the digitalization of the economy. Introduction of digital technologies, development of ecosystems leads not only to modernization of production technology, but also to change of corporate culture, staff mentality and, as a consequence, personnel management practices. [18]

COLLECTIVE INTELLECT AND SELF-MANAGEMENT OF EMPLOYEES IN THE SOCIO-ECONOMIC ECOSYSTEM

The competence and professionalism of employees is an important determinant of ecosystem development. In a strategic perspective, assessment of the formation of intellectual capital a firm involves improvement of the system of motivation and stimulation of activity of employees and purposeful management of development of labor collectives. The research allowed to trace the dependence of financial parameters of company activity on the work environment, behavior of employees and their relevance to the case. [19]

The most successful ecosystems are those that bring together educated and highly intelligent employees, not just employees, but full-fledged subject of decision-making.

The evolution of the formation and development of socio-economic ecosystems shows that their landscape is formed under the influence of the intellectual firms that included into them. One of the basic characteristics of such firms is the *intelligence of employees*. In the sum of it forms what can be designated as *collective intelligence*, which can improve the productivity and functioning of ecosystems. As result of research collective intelligence have found evidence of relevance to the development of ecosystems in general. These result in collective intelligence being higher than the average intelligence of the participants and the maximum intelligence of the group members. It means that collective intelligence is of independent importance to the functioning of the socio-economic ecosystem. Consequently, the creation of an enabling environment for intellectual work is an important feature of the development of modern ecosystem companies.

Since ecosystems are composed primarily of intelligent firms, they should be managed in a non-legislative method, as in traditional business structures, but on the basis of participatory management principles. Intellectual firm is an organization where the basis of activity — creativity of participants, i.e. the purpose of its existence is to use intelligence. [20] The operation of an intellectual firm presupposes a democratic model of management and the implementation of the principle of self-management. Participatory management expands the field of creation and economic activity of such firms, which constitute the core of modern socio-economic ecosystems.

Intelligence requires very flexible work and special motivation, which affects the organizational structure of management and relationships between ecosystem employees. Applicable to the activities of intellectual firms, constitute the basis ecosystems, among the top management tasks in the field of intellectual development of employees are the following:

1. Development of the competence of the labor collectives on the basis of an innovative approach to the development of the content of training specialists in order to create basic and professional competencies, skills of self-management and formation of a participatory

corporate culture in the intellectual economy.

2. Formation with the purpose enhancing the innovation of effective project teams.

3. Unlocking the intellectual potential of different categories of ecosystem workers by creating a motivational mechanism are best suited the interests of employees, their personal qualities and interests.

Research results show that the conflicting labor relationship between the company's employees and management negatively affects the innovation efficiency and reduces the firm's intelligence, while cooperative relationships based on self-management and trust among participants contribute to the generation of innovation within the ecosystem. [21]

In this context, urgency of the problem is increasing of employee involvement. Results of research conducted by the consulting company Tower`s Perrin show the correlation between the growth of company income and staff involvement. As it turned out, only 20% of the 90000 employees in 18 countries felt fully involved in the work process, going beyond their mandated functions and responsibilities, aided by awareness of importance of the work performed and dedication. [21] At the same time, the companies with the most involved personnel showed a 19% increase in revenues and a 28% increase in earnings per share. The companies with the lowest participation rate showed a 32% decline in earnings and earnings per share fell by 11%.

According to Worldatwork's research, the following factors have a significant impact on involvement [22]:

1. Application of fair remuneration both material (based on KPI measurement) and intangible (merit recognition).

2. Opportunities for career and professional development.

3. Use of preferences according to the "buffet", i.e. the opportunity to choose some benefits for the employee.

4. Individual approach, opportunity to engage in interesting project. For example, in the Google ecosystem, designers are specifically given 20% of the time to develop their own projects of greatest interest.

5. Annual meetings of Chief Operating Officer (COO) with each high performing employee to discuss his expectations regarding remuneration options. In addition to financial, other employee values (such as flexible working schedule) are also discussed.

6. Creation of cross-functional teams of efficient ecosystem employees.

All the above factors indirectly affect the position of the employee in the socio-economic ecosystem. From our perspective, the most effective mechanism of labour collective involvement can be the financial participation of employees, the various forms of which are already being implemented in practice on the basis of both a special form of legal entity or a special legal regime and provisions of general corporate and economic law. The issue of financial participation of ecosystem employees is in line with the main trends in the development of the theory of the firm and the practice of management of organizations. However, extensive development of participatory systems of governance based on values such as solidarity, mutual trust and inclusion have, over time, also had a positive impact on society as a whole.

The principle of employees' financial participation, based on considerations of economic democracy, implies, above all, the provision of employees, in addition to a fixed wage, a variable part of income directly related to profits.

The following forms of financial participation of employees are distinguished [23]:

- profit participation (cash and equity, current and deferred);
- shareholding (fractional) ownership of individual employees (including options);
- collective property management schemes, such as an employee stock ownership plan (ESOP), based on shares or fractions in the

company's capital; at the ecosystem level, a combination of a savings plan and a mutual investment fund is possible.

An example of the implementation of participatory management practices in Russian conditions is the ecosystem "Sber", within which five bank offices in the Moscow region Balashikh transformed labor relations on the basis of employee self-management, or the concept of "turquoise management". [24].

Development of socio-economic ecosystems consisting of intellectual firms with democratic economic system leads to domination of "flat" organizational structures in business practice, self-managed (Agile) teams and so-called "turquoise organizations". In fact, as rightly noted by D.V. Kuzin and I.P. Ponomaryov, this is about "disappearance of managers in the traditional sense, but with preservation of the management function". [25]

«ECOSYSTEM MANAGEMENT»: COMPENSATION OF EMPLOYEES

In the context of "ecosystem management", the issue of personification of remuneration systems for ecosystem workers is becoming topical in the context of their individual achievements — KPI, where formation of tools aimed at management and development of certain competencies within the framework of specific types of work and projects. Today in the agenda of discussion of professional forums there are issues related to the external and internal HR-brand of the ecosystem, impact of loyalty and engagement programs on labor efficiency, creation of conceptually new programs of health and welfare of employees in correlation with labor productivity. At the same time, the digitalization processes accompany all issues of discussion in the field of human resources management, as digitalization and technology change the approach to the competences of ecosystem personnel, organization and regulation of labor.

With regard to payment systems for employees in socio-economic ecosystems, in our view, the most optimal will be a combination of two methods — rewarded based on KPI (Key Perfomance Indicator) and grading. KPI refers to a system of financial and non-financial indicators, which are performance indicators for the achievement of the organization's strategic objectives, allowing for tactical management based on the developed interim operational indicators. [26] The KPI-based rewarded scheme allows for a transparent, fair and differentiated payment system, optimize the use of Salary Fund and, in general, improve staff performance. Grading — a system of procedures for the evaluation and ranking of positions, as a result of which they are allocated to groups (grads) according to their value for the company. [27] Grading gives the opportunity to introduce a single unified salary system for all divisions and branches. In this way, a transparent system of professional and career development is built, which helps to retain valuable professionals in the ecosystem.

Combined payment system based on KPI and grading allows to quickly assessing the effectiveness of companies, entities and individual staff members in terms of achieving their business objectives, fixed for a certain period, and make optimal decisions after analysis of the results. Overall, this approach is a powerful tool for achieving the objectives and strategy of the socio-economic ecosystem in terms of labour relations.

However, if we consider the labor relations arising in the online platforms (and this is part of ecosystems), now there are problems and imbalances in the regulation of such relations, what concerns the federal authorities. In particular, Deputy Minister of Economic Development of the Russian Federation Vladislav Fedulov noted, "as in any new, rapidly growing market, of course we see risks and see areas in which we need to further protect users' interests. The first — is labour relations within large ecosystems. The

simplest example — contract terms between the aggregator and taxi drivers. In fact, the driver is not registered in the state, he has all the responsibility, and he pays a fee for entering the platform, not to mention taxes. Whether this model — is correct is a question. We consider that in some cases there are clear imbalances". [28]

This is about such services as Yandex, Mail.ru Group and other marketplaces and aggregators connected with taxi services, food and goods delivery services, etc. The above online platforms are intermediaries between the performers and the users of services. In such conditions "labor relations gradually cease to be so, having acquired a civil-legal character, if at all, are not regulated by any laws". [29]

Today there are several methods, how online platforms is build labor relations with employees.

First, the employment contract. When accepting an employee under an employment contract, the ecosystem independently pays individual income tax in the budget, payments in the Fund of social insurance, Federal Compulsory Medical Insurance Fund, Pension Fund of the Russian Federation etc. In addition, the ecosystem assumes responsibility for providing the social and labour guarantees enshrined in the Labour Code of the Russian Federation.

Second, the contract with individual entrepreneur (IE). The conclusion of a contract with an individual in IE status. In this case, the ecosystem does not pay insurance fees and individual income tax. IE independently pays taxes, insurance fees, and reports to the Federal Tax Service.

Third, the contract with the self-employed. In this case, the contractor individually pays a tax of 4% of the income when working with physical persons, and when working with legal persons — 6%. The ecosystem does not pay insurance fees and individual income tax.

Fourth, a civil-legal contract (CLC) in which the ecosystem does not pay the insurance fees for occupational accident and illness insurance, and also the case temporary disability and motherhood. All other fees and individual income tax are assessed in the same amount as in the case of an employment contract.

According to the Strategic Development Center, now about 9% of the executives, cooperating with online platforms, work under the CLC agreement as individuals, 55% are registered as self-employed, 33% work under a formal employment contract, the remaining 5% are registered as IE. At the moment, the practice is that online platforms are interested in the construction of "gray" labor relations. Therefore, the status of platform employees is actively discussed and made the subject of court proceedings. In this regard, there are a number of issues related to the protection of ecosystem employees and the provision of social guarantees.

In addition, in the conditions of impending ecosystem domination, there will be questions as, how employees can forming trade union and whether it is possible for them to conduct collective negotiations on the conclusion of a collective agreement without its official registration, to create a "digital trade union". Can such employees initiate a collective labour dispute with the employer in order to protect their collective labour rights, form a conciliation commission, labour arbitration or strike? [30]

On 30 September 2021, the first meeting of the working group on the regulation of platform employment in Russia was held at the site of the Strategic Development Center.[1] Results of an independent study of the best Russian and foreign practices in regulating relations between platforms and service providers were presented during the event. The main conclusion reached by the experts was that the ecosystem labour sphere needs to

[1] URL: https://www.csr.ru/ru/news/tssr-provyel-pervoe-zasedanie-rabochey-gruppy-po-regulirovaniyu-platformennoy-zanyatosti/?fbclid=IwAR 2MlcaEX6kD 2oZYiiN 4RGSV2mZg OV PRTaJiBrKEdiFf26IpDJZgiF_uugs (accessed: 01/11/2021).

be legislated to provide greater legal certainty and guarantees for platforms and platform' employees.

CONCLUSION

Thus, the economic landscape has undergone significant transformation in recent years, related to the accelerated development of socio-economic ecosystems — new large integrated business structures consisting of interconnected intellectual firms. In this connection, there is a need to change the paradigm of management of human resources of companies, creation of a new architecture of labor relations in terms of "ecosystem management". The strategy for optimal development of socio-economic ecosystems will include a system of measures that ensure a high level of motivation of protecting the interests of ecosystem workers, involving them in ecosystem management, creating institutional conditions for the development of democratically managed companies, in which a system of participatory management and financial participation of labour collectives is practised.

In our view, organizational and economic mechanisms of formation and development of ecosystems should be aimed at "construction" of a favorable institutional environment for development in the ecosystem of collective forms of management, protecting the interests of ecosystem employees. This, in turn, means establishing and developing institutions to support a system of self-management structures and financial participation — both external (legislative provision of ecosystem employment, formation of supporting structures for democratically managed companies) and internal (democratization of management in ecosystem companies, formation of systems of training of employees of self- management and the best practices of participatory management).

Maintaining the benefits of collaborative forms of ecosystem management and addressing their potential weaknesses is possible through the scaling-up of labour and capital partnerships in production management and distribution results. Among the factors that sustain such benefits — introduction in the framework of socio-economic ecosystems of various practices of training all employees in the basics of self- management, democratic management, financial literacy, managerial and economic knowledge. Such an approach would take advantage of modern democratic economics and minimize the potential risks of digitization.

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The Possibility of Identifying Alpha-Companies by Statistical Methods on the Example of the Express-Logistics Market In Russia

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ABSTRACT

The article attempts to evaluate the use of the conventional statistical apparatus to identify alpha companies in the Russian express logistics market. According to the theory of economic dominance, Alpha-companies occupy dominant positions in industry markets due to access to the cheapest resources and institutional advantages that allow them to build barriers to other players. Identification of such companies has traditionally been carried out by an expert method, including based on insider information, not available to external market players. The author describes the traditional tools used to identify the dominant market players [concentration indices (*CR*), Lind (*L*) and Herfindahl-Hirschman (*HHI*)], made calculations based on official statistics, data from open ratings and other available benchmarks for the express delivery industry in Russia, as well as a comparison with the results of determining alpha companies by an expert method. The author formulated hypotheses to explain the reasons for situations when companies with dominant capabilities are not interested in realizing their potential in a small market. Additionally, the author used some assumptions about the role of institutions regulating the market in case of sharp changes in market conditions.

Keywords: theory of economic dominance; Linda index; Herfindahl-Hirschman index; oligopoly; monopolistic competition; Express delivery; SER; antitrust regulation

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INTRODUCTION

According to the theory of economic dominance [1] in each market it is possible to divide companies into three types: alpha (dominant firms with priority access to cheaper resources, the most advanced technologies and institutional advantages, capable of influencing the existing market «rules of the game», including entry barriers, but also invest the most in market development for the benefit of all participants, setting quality standards in this market and leading communication with regulators), beta (typically niche leaders with significantly more expensive resources) and gamma (all other companies). Since the boundaries of each market in the real world are conditional, for competition with each other alpha companies can establish or acquire dependent beta and gamma companies. These associations are called Alpha Empires, as alpha provide their satellites with institutional support and access to their resource base, which strengthens the position of the corresponding beta and gamma in their markets. [2]

The identification of alpha companies in a particular market, generally, based on expertise on the market any unique methodology reflecting the specifics of the market. [3–7] For example, author identifies the following five alpha companies in article [8], which analyses the logistics industry in the Russian express delivery market:

- "Post of Russia" JSC — Russian company, owned by the state with the largest network of branches, performing a significant social function in our country;
- DPD — Russian "DPD Rus" JSC is part of the network of DPDgroup, owned by the international holding GeoPost. The company considers itself a "acknowledged leader of the Russian market of express delivery of parcels and cargoes";
- DHL — second after Amazon the largest logistics operator in the world, in Russia more working with corporate customers. Historically, DHL is a German mail subsidiary;
- UPS and FEDex — Russian units of transnational logistics companies.

According to the author, who is an expert in this market, all five above-mentioned companies compared to the other players in the market of express delivery have the following advantages: "low-cost financing, technological strength, organizational process asset, legal preferences, privileged relationship with the State, substantial access to foreign markets". [8] Assessment of such characteristics of companies can be done only by expert method, but it is logical to assume that in the presence of such advantages should be objective results, which can be seen through open sources: official reporting, ratings and rankings and other benchmarking. We test this hypothesis considered several open sources of information and applied commonly accept market concentration measures to them:

1. **Concentration indices (CR_n)** — sum of market shares n the largest players. The index does not have a single universally accepted economic meaning [9] and is traditionally used in combination with other indices.
2. **Herfindahl-Hirschman Index (*HHI*)** — evaluates the state of concentration/monopolization of the market and calculated as the sum of squares of the shares of each firm's sales. [10] At a value within the range 1 800 and 10 000 *HHI* is considered highly concentrated, 1000–1800 — medium (moderately) concentrated, less than 1 000 — weakly concentrated. [11]
3. **Lind Index (*L*)** used to identify oligopoly or dominant "core of the market", as Remo Lind himself called it. [12] It is calculated sequentially for the two largest companies in terms of revenue, then 3, then 4, etc., when the downward continuity is disrupted and L_n is less L_{n+1}, it is considered that n companies make up the oligopoly in the market. The calculation formula is as follows:

Table 1

Calculation of Lind's indices and concentrations for the 10 largest companies in the industry 53 "Post and Courier Activities" for 2020

No.	Organization	Revenue, mln rubles	Region	Market share,%	L	CRn, %
1	"Post of Russia" JSC	211 067	Moscow	71.66	N/a	71.66
2	"SDEK-Global" LLC	15 701	Novosibirsk region	5.33	6.72	76.99
3	"Courier Communication Central Board" FSUE	9 947	Moscow	3.38	4.64	80.37
4	"Packages" LLC	4 643	Moscow	1.58	4.45	81.95
5	"Major Express" LLC	4 628	Moscow	1.57	3.60	83.52
6	"SUBMARINER" LLC	4 502	Moscow	1.53	2.91	85.05
7	"Courier-Region Capital" LLC	3 740	Moscow	1.27	2.50	86.32
8	"Arvato Rus" LLC	2 929	Yaroslavl region	0.99	2.27	87.31
9	"Crimean post office" FSUE	2 405	Republic of Crimea	0.82	2.11	88.13
10	"Distance trading service" CJSC	2 364	Moscow region	0.80	1.92	88.93

Source: author's calculations based on data from the TestFirm.ru portal.

$$L_K = \frac{1}{K(K-1)} \sum_{i=1}^{K-1} Q_i,$$

$$where\, Q_i = \frac{\frac{CR_i}{i}}{\frac{CR_K - CR_i}{K-i}}$$

$$or\, L_K = \frac{1}{K(K-1)} \sum_{i=1}^{K-1} \frac{\frac{CR_i}{i}}{\frac{CR_K - CR_i}{K-i}},$$

where:

K — number of large retailers;

i — number of leading retailers among K large retailers;

CR_i — market share of the i leading retailers;

CR_K — market share for K large retailers.

We assume that the presence of alpha companies in the market should show the presence of high concentration (*HHI* > 1800) or the presence of an appropriate oligopoly size on the Lind index. [13] An important feature of the Lind index is the inability to distinguish one dominant company in the market (as the calculation begins with two companies at once), so you should to monitor such cases manually, and the *HHI* index in these situations shows very high rates.

Check on official accounts at TestFirm.

As the first source of information let us take data from the official reporting from the portal Testfirm.Ru on the industry 53 on Russian classification of economic activities "Postal and courier activities",[1] the closest to the courier delivery industry, by revenue for 2020 (*table 1*).

The Lind coefficient does not determine oligopoly, as the largest market player occupies almost 72%, and the share of all other players is significantly lower. The *HHI* index for ten companies[2] shows a value of 5 186,

[1] URL: https://www.testfirm.ru/rating/53/

[2] If more companies are counted, the HHI index will continue to grow.

Fig. **The structure of sub-sectors of industry 53 according to OKVED**

Source: Testfirm.ru. portal.

which indicates the highest concentration of the market.

Of the five alpha express delivery market, we see here only one — "Post of Russia" JSC, in second position — SDEK, which the expert considers a beta company, and in the third — another state-owned company "Courier Communication Central Board" FSUE, which in the original classification referred to gamma. The absence of four more alphas in the list primarily indicates that official statistics do not notice them in the part of express delivery, as companies do not classify their services to the industry 53.

We could also take a subsector of the industry 53, which represents exclusively courier activities, but in the subsector 53.20 (and in all the sub-sectors invested) we will not see "Post of Russia", as it has all the revenue belongs to the industry 53.10 "Activities of the general postal service" (see *figure*).

In general, it is expected that calculations based on official reporting data, structured according to the Russian classification of economic activities (RCEA), may not confirm the opinion of the market expert. Therefore, firstly, four of the five alpha are international companies, possibly, with their own accounting rules, and secondly, companies have no obligation to reflect their services in the fast delivery industry we are researching.

For example, in the "neighboring" sector 52.24 "Cargo handling" can be found DHL ("DHL INTERNATIONAL" JSC, revenue in 2020–15 443 mln rubles) and DPD ("DPD RUS" JSC, revenue in 2020–18 005 mln rubles). In the sector 52.29 "Supporting activities other related to transport" is found UPS ("UNITED PARCEL SERVICE (RUS) LLC" 3 298 mln rubles), and in the sector for express delivery 53.20.3 "Courier activities" found Fedex ("FEDEX CORPORATION RUS" LLC) with the revenue 8.56 mln rubles in 2020, ranked 616th in revenue in its industry. Probably, FEDex provides services in Russia not only through its legal entity, but also through its partner — Major Express.

If we look at the sector 52.24[3] separately, that the first 50 *HHI* companies will be equal 316 and Lind index will not reveal the presence of a dominant group (*table 2*).

On the other hand, you can see that both alpha express deliveries, who transferred their proceeds to the sector 52.24, in this sample "diluted" by companies from other subsectors (sea terminals, oil transportation, etc.), and in the case of a "cleaned" sample, they would

[3] URL: https://www.testfirm.ru/rating/52_24/

Table 2

Calculations of the Lind's and CR indices for industry 52.24 "Cargo handling" for 2020

Rank	Organization	Revenue, mln rubles	L	Market share, %	CRn, %
1	"Ust-Luga Oil" JSC	27612	N/a	7.33	7.33
2	" Taman Seaport" LLC	24190	0.571	6.42%	13.75
3	"Novorossiysk Commercial Sea Port" PJSC	22465	0.389	5.96	19.71
4	**"DPD RUS" JSC**	**18005**	**0.328**	**4.78**	**24.49**
5	"VOSTOCHNY PORT" JSC	16258	0.280	4.32	28.81
6	**"DHL INTERNATIONAL" JSC**	**15443**	**0.241**	**4.10**	**32.91**
7	"Taman Neftegas" CJSC	14561	0.212	3.87	36.77
8	"Vostochnaya Stevedoring Company" LLC	13023	0.193	3.46	40.23
9	"OTEKO-Portservice" LLC	10961	0.183	2.91	43.14
10	"Nakhodka Commercial Sea Port" JSC	10641	0.171	2.82	45.97

Source: Testfirm.ru. portal.

Table 3

Companies with the main activity "Express delivery" from the MainMain public rating

Rank	Company	Main activity	Revenue, rubles
2	SDEK	Express-delivery	9 500 000 000
4	DHL	Express-delivery	15 000 000 000
13	Boxberry	Express-delivery	1 900 000 000

Source: URL: https://mainmine.ru/transportnye-kompanii/2020

most likely become visible for both statistical indicators.

ALTERNATIVE SOURCES OF INFORMATION

As alternative sources of information is consider public ratings. They are usually compiled on the basis of information voluntarily presented by the rating participants, so may not contain data for all companies, or — the consolidated data of the official accounts, whose shortcomings we mentioned earlier.

MAINMINE PUBLIC RATING OF TRANSPORT AND LOGISTICS COMPANIES

The MainMine rating[4] for 2020 allows you to select companies for which the express delivery market is the main, but that builds on those who posted information about themselves on the portal MainMine, where state-owned companies, first of all "Post of Russia" are excluded by the decision of the rating compilers.

[4] URL: https://mainmine.ru/transportnye-kompanii/2020

Table 4

Rating of delivery services in Moscow (2020)

Rank	Name	Rating number	Scale	Reliability	Recognition
1	"Dellin"	94.0	4.9	4.4	5.0
2	PONY EXPRESS	93.4	5.0	4.8	4.6
3	SDEK	84.8	4.5	4.8	4.0
4	DPD	84.0	4.9	4.8	3.4
5	DHL	71.6	2.8	4.9	4.0
6	КурьерСервисЭкспресс	71.1	2.6	5.0	4.0
7	Dostavista	68.9	2.3	4.4	4.3
8	UPS	64.7	3.3	4.9	2.5
9	Major Express	61.6	3.7	4.8	1.7
10	SPSR	61.5	4.3	4.7	1.2

Source: data of RAEKS-Analytics LLC (RAEKS rating agency).

Also in the rating on the 5th place is DPD with the revenue of 14 bln rubles, but its main type of activity is indicated by "groupage cargo". Based on such statistics it is difficult to talk about the dominance of five alpha companies in terms of revenue in the market, although this does not exclude that they may be the most profitable or operate on the most marginal parts of the express delivery market.

RATING "RAEX" — COMPREHENSIVE ASSESSMENT OF COURIER COMPANIES IN MOSCOW

The well-known rating agency "PAEX" has offered its method of ranking of express-delivery companies,[5] where revenue takes only 20% of the three groups:

1. Scale (total 40%):
   a. Company age — 5%;
   b. Revenue for 2018 (without 2017 year) — 20%;
   c. Number of personnel by SPARK Interfax — 15%.
2. Reliability (total 20%):
   a. Data on litigation — 15%;
   b. Prudence index (SPARK) — 2,5%;
   c. Financial risk index (SPARK) — 2,5%.
3. Recognition (total 40%):
   a. Site quality index — 15%;
   b. Average rating of the company in Google and "Yandex" — 7,5%;
   c. Number of evaluations in Google and "Yandex" — 12,5%;
   d. Number of references in the media for 2019–5%.

The method was applied to courier services operating in Moscow, the results were published in May 2020,[6] one month into the pandemic. With this method of counting "Post of Russia" at all did not get into the final rating, but the other four alphas got in the top ten, sharing the championship with the beta and gamma companies (*table 4*).

If you do not have expert information about each of the companies in this table,

[5] URL: https://raex-rr.com/methods/94

[6] URL: https://raex-rr.com/business/rating_of_delivery_services#table

it is difficult to identify the known alpha companies by any criteria.

ALTERNATIVE SCAN-INTERFAX EXPRESS DELIVERY MARKET RANKING

Edition "Information resource SCAN", owned by "News Agency Interfax" JSC, makes a rating of companies on the express delivery market by the number of references in the media, visibility and reach of the audience. All five alpha companies are almost always in the top-15 in each category, often leading them. For example, in the first half of 2021, the global postal company FedExpress topped the rating in terms of the number of references and the visibility index,[7] and by 2020, DHL was the audience leader.[8]

But, again, nothing can be said about their dominance or substantial permanent separation from other companies in the industry by any characteristics.

CONCLUSION

The conducted analysis of available sources of information showed that it is difficult to identify in the Russian market alpha-companies based on publicly available information without the involvement of a sector expert, since:

- for microindustries, official statistics are of little use, because companies make decisions to classify their own revenue as part of an RCEA code on which official statistics are based, that may not coincide with the real situation;
- distinguishing revenue from companies belonging to one of the markets in which the company operates, is impossible without the company's willingness to provide this information, which does not always correspond to its business interests. Perhaps one of the alpha mentioned in the article has fairly modest figures on revenue in the Russian market and does not want its customers to be aware of this;
- by proxy indicators of the company's activity in the market (popularity, media references, etc. alpha-companies also do not necessarily occupy a leading position, because, having institutional advantages, they may not be interested in additional wide publicity.

It is important to note that even if we have open information on revenue across the required microindustry, we can face the situation, when the revenue of the alpha company in this micro market loses to both beta and gamma companies. This can be for various reasons and should not surprise: for example, the alpha company does not see any prospects in the development of this market, but it is necessary to attend it, as it is important for key customers of the company. In this case, the alpha will still have to maintain its level of quality, setting its upper limits for other players, bringing modern technology and participating in the definition of market rules (i.e. actually bear the costs of developing this micro market), but not dominating part of the market share. It appears that this situation in 2021 is developing on the micro vertical of delivery of goods from online-stores (where the biggest players — their own online shopping services Ozon and Yandex) and delivery service, where many new players — Yandex. Lavka, Samokat (affiliated with the Sberbank Group), a five-alpha express delivery not yet visible.

And, perhaps, the most interesting question for future research — these are the speed and methods of the alpha companies' response to the changes in market conditions, which is especially rapid in the crisis. On the express delivery market, where previously "Post of Russia" dominated the mass segment and international players served the most secure corporate customers, B 2C-delivery market is now actively growing (largely due to the pandemic), not only in our country, but all over the world. New active players — the same

[7] URL: https://scan-interfax.ru/ratings/rejtingi-operatorov-ekspress-dostavki-1-polugodie-2021/

[8] URL: https://scan-interfax.ru/ratings/rejtingi-operatorov-ekspress-dostavki-2020-god/

Wildberries and Ozon — in many regions are ready to deliver orders the next day. How stable will the position of alpha remain if new players pay attention to classic express delivery markets? And would a market regulator, such as the Federal Antimonopoly Service, protect historically dominant players from such expansions?

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Scenario Approach to the Assessment of Development Prospects of the Russian Regions

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ABSTRACT

The article describes the features of building and assessment of spatial development scenarios in long-term forecasts. The author used the scenario approach for qualitative and quantitative assessment of alternative strategies for regional development within the framework of the macroeconomic forecast for the development of the Russian economy. Further, the author analyzed the experience of developing spatial scenarios for the EU countries and Russia. Next, the long-term regional trends are presented, which, due to the high inertia of space, will determine spatial development in the future. The author also describes modern problems that significantly impact the choice of strategies for the regions. Prospects for spatial development the author assessed in the framework of three forecast scenarios. For two options of the macroeconomic forecast, the author calculated quantitative estimates of the spatial development parameters characterizing the scenarios. Relevant calculations the author performed using macroeconomic and interregional forecasting and analytical models. Finally, the author showed the advantages of the scenario of balanced growth from the standpoint of implementing national goals of social and economic development.

Keywords: spatial development; long-term trends; priorities of spatial development; conservative scenario; scenario based on agglomeration; balanced scenario; structural and investment policy

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INTRODUCTION

Spatial development challenges[1] attracted a new wave of attention, including public administration, after the crisis 2014–2015, during a search for sources of economic growth and solutions to the worsening social and environmental problems with strong regional allocations. In 2017, the Foundations of State Policy of Regional Development of the Russian Federation for the period up to 2025 was approved,[2] in 2019 — Strategy of spatial development of the Russian Federation for the period up to 2025,[3] in which the solution of the problems of spatial development is considered one of the priorities of the long-term development of Russia. Contemporary challenges facing the international community: need to shift towards sustainable development, the coronavirus pandemic, the climate agenda, despite its global nature, also has strong regional specificities.

For Russia, a country with a great variety of natural and climatic, socio-economic, ethno cultural conditions, the importance of taking into account the spatial aspects of development is not denied, but the practice of developing official documents that support the country's development prospects shows that the spatial limitations of the national dynamics are not always taken into account.

The Federal Law "On Strategic planning in the Russian Federation",[4] which adopted in 2014, list of documents whose development involves a regional dimension; this applies to long-term forecasts of socio-economic development of the Russian Federation, forecasts of development of macro regions and subjects of the Russian Federation. A number of regulations have now been adopted, governing the development of such forecasts.[5] However, the long-term forecast of the socio-economic development of the Russian Federation for the period up to 2036, submitted by the Ministry of Economic Development of Russia,[6] regional level does not include. In the Socio-economic Development Forecast of the Russian Federation for 2022 and the planning period 2023 and 2024[7] are given a number of indicators for individual regions, taken from forecasts developed in isolation in the constituent entities of the Russian Federation and not coordinated with each other.

However, long-term impact assessment, which may arise in the implementation of alternative spatial development strategies, allows linking the macroeconomic forecast with the real socio-economic processes, taking place in the territory, determining the sources of growth and nature of which is related to space. And identify the most acute problems in the development of regions, the solution of which is necessary for the implementation of the provisions of the macroeconomic forecast.

Trends in economic space formed by a number of basic factors determined by the characteristics and patterns of spatial development. These include: natural resource endowments, advantageous geographical location, agglomeration effects and high

[1] In the article the terms "spatial" and "regional" development are used as synonyms.

[2] Foundations of State Policy of Regional Development of the Russian Federation for the period up to 2025. Approved by the Decree of the President of the Russian Federation from 16 January 2017 No. 13. URL: https://docs.cntd.ru/document/420389221 (accessed: 22.11.2021).

[3] Order of the Government of the Russian Federation from 13 February 2019 No. 207-P "Strategy of spatial development of the Russian Federation for the period up to 2025". URL: http://government.ru/docs/35733/ (accessed: 22.11.2021).

[4] The Federal Law "On Strategic Planning in the Russian Federation". URL: https://www.consultant.ru/document/cons_doc_LAW_164841/ (accessed: 22.11.2021).

[5] Rules for the development, adjustment, monitoring and control of the long-term forecast of socio-economic development of the Russian Federation (approved by decree of the Government of the Russian Federation from 11 November 2015 No. 1218). URL: http://base.garant.ru/71245076/#ixzz4zYqfiCtw (accessed: 22.11.2021).

[6] Forecast of socio-economic development of the Russian Federation for the period up to 2036. Ministry of Economic Development of the Russian Federation. 2018. URL: https://www.economy.gov.ru/ material/file/a5f3add5deab665b344b47a8786dc902/prognoz2036.pdf (accessed: 22.11.2021).

[7] Forecast of socio-economic development of the Russian Federation for 2022 and for the planned period 2023 and 2024. Ministry of Economic Development of Russia. 2021. URL: https://www.economy.gov.ru/material/file/d7f5f5dea44bda4c30d42aac04cc1fca/prognoz_socialno_ekonom_razvitiya_rf_2022–2024.pdf (accessed: 22.11.2021).

population density, developed infrastructure, human capital, institutions that contribute to the improvement of the entrepreneurial climate, the growth of population mobility, the spread of innovation, etc.[8] [1–4] Different combinations of factors in specific territories form the potential for regional development. The possibilities and ways of its realization depend on the priorities of spatial development adopted at the state level and at the level of large companies, regional distribution of resources (primarily investment), and implemented regional policy.

Scenario approach is widely used in forecasting socio-economic processes, including the development of spatial systems. The article uses the scenario approach to assess long-term alternative strategies of spatial development of the Russian economy, which may arise from different combinations of internal (regional) and external factors determined by long-term national economic prospects.

REVIEW OF STUDIES ON SPATIAL SCENARIOS

The problem of taking into account spatial factors and constraints when substantiating strategies for long-term development is relevant primarily for individual countries and integration associations, within which regions (countries) are located, significantly different levels of economic development. The scenario development experience is interesting in terms of the choice of spatial development strategies and economic policies that support the scenarios.

Under the ESPON 2050 project,[9, 10] 3 spatial development scenarios of the EU countries are considered for the period up to 2030 and 2050, which are determined by the nature of the driving forces organizing the space: scenario A — "Megacities of Europe", scenario B — "Cities of Europe" and scenario C — "Regions of Europe". Scenario parameters quantified based on econometric predictive models. [5, 6] A detailed description of European scenarios is given in the paper "Assessment of scenarios of spatial development of the Russian economy until 2030". [7]

Alternative strategies for growth and development of integration processes in the context of recovery from the economic crisis are presented for two blocks within the EU: Western European and Central and Eastern European countries. [8] Scenarios are based on two different historical growth patterns from Western and Eastern Europe, where it is understood that each of the blocks can choose their development strategy based on external circumstances. For Central and Eastern European countries (CEE), newly admitted to the EU, the first strategy involves modernizing the existing production structure, shifting to more advanced industries, strengthening the second-rank city system, improving research and innovation. The second strategy focuses on the development of traditional CEE industries, and taking advantage of the competitive advantages of the CEE countries in terms of the cost of production and attracting foreign investment.

For Western Europe (EU 15) two strategies are presented also. The first focuses on the renaissance of Western Europe as a global center for manufacturing. The alternative strategy assumes that Western Europe is almost completely out of production and focuses on the provision of advanced services globally, and moving from low-level, labor-intensive services to knowledge-intensive and business services. The combination of possible alternative strategies by CEE and EU 15 countries allows four different scenarios to assess possible impacts, of which the macroeconomic industry model of growth of regions MASST3 was used. [9]

Scenario analysis suggests a number of recommendations for economic policy. The

[8] The World Bank. New Perspective on Economic Geography. World Development Report 2009. Moscow: Publishing house "The whole world"; 2009. 384 p.

[9] European Territorial Scenarios 2050. ESPON 2050. URL: http://www.et2050.eu (accessed: 22.11.2021).

[10] Making Europe Open and Polycentric. Vision and Scenarios for the European Territory towards 2050. URL: http://www.et2050.eu/attachments/article/523/ESPON_Vision-Scenarios_2050.pdf (accessed: 22.11.2021).

general observation is that the effectiveness of strategies for the CEE strongly depends on the strategy chosen by Western European countries. The greatest results are achieved by returning to the updated industrial specialization model in Western European countries and modernizing the economies of the CEE countries. The scenario most appropriate to the current situation, where both blocs maintain their actual specialization, provides the lowest economic growth parameters. The results obtained are in mainstream with the current trends of the revival of interest in industrial policy as a means to revive the economy under conditions of crisis and stagnation.

Spatial development scenarios that conceptualize two well-known theories of regional growth — polarized and levelling — were presented in the long-term forecast of Russia's development up to 2030. [10] Determining factor in the creation of scenarios was the choice of the model of spatial organization of production and resettlement: competitive (relying on the most competitive regions) or diversified in space (a strategy of using endogenous factors in regions and supporting regional competitiveness) growth. Accordingly, two spatial development scenarios were developed as alternatives to the conservative: competitive and diversified growth. The quantitative assessment of spatial scenarios showed that the difference between the total contribution to economic growth and the implementation of different spatial scenarios is not large, however, the development of individual macro regions depends significantly on the chosen scenario.

Assessment of a wide range of alternatives for the development of urbanized areas of the country with a focus on the development of the regions of Siberia and the Far East presented in the framework of four long-term development scenarios[11]: "broad international cooperation", "limited partnership", "concentration of the country", "preservation of the territory".

A number of scenarios have been developed based on more detailed consideration of selected spatial development issues. The article [10] presents three alternative scenarios of development of the Siberian macro-region within the framework of the megaproject "Siberian Ark". Scenarios differ in the choice of priorities in the development of the macro region and the strategy for achieving the goals. The paper [11] presents five scenarios of formation of a prospective spatial organization of Russia: inertial; competitive (which implies the continuation of active economic development of major agglomerations and resource regions); locally diversified (oriented on active government regulation of spatial development); "siberian doctrine" (oriented on intensive development of Siberia and the Far East); and "USPeh: Ural, Siberia, Volga region" (envisaging active structural changes in the economy of old industrial federal districts).

Analysis of literary sources shows that the most interesting and analytically useful aspect of scenario development is the formation of meaningful hypotheses with alternative strategies of space development. Within the model designs used, the quantitative parameters of the macro-level scenarios tend to differ insignificantly,[12] however, for individual regions (or countries), the choice of a strategy can fully determine the prospects and challenges for future development.

ASSUMPTIONS FOR SCENARIO FORMATION

The long-term prospects for regional development depend significantly on how the Russian and world economies develop.

Strategic goals of Russia's development are presented in the Decree of the President of the Russian Federation "On national order to development of the Russian Federation for

[11] Siberia and the Far East in the XXI century: scenario options for the future. Krasnoyarsk: Siberian Federal University; 2018. 76 p.

[12] Structural and investment policy for ensuring economic growth in Russia. Moscow: Scientific Consultant; 2017. 196 p.

the period up to 2030".[13] They are aimed at breakthrough scientific, technical and socio-economic development and include all key areas of the economy, including economic and social restructuring of the country and all its regions. Diversities of future development of regions are determined depending on how it is possible to overcome the established spatial trends in the future (which are predominantly negative) and implement a strategy that sets new benchmarks and conditions for development.[14]

The trajectory of the Russian economy's exit from the crisis and transition to a new model of economic growth is an essential factor for the formation of scenarios of long-term development of the regions. Directions of economic development of Russia were proposed during discussions on economic growth, most of these directions are reflected in the scenario of socially oriented development IEF RAS.[15]

From the point of view of formation of meaningful hypotheses of scenarios it is essential to diversity connected with possible alternatives of spatial development of Russia: changing demographic trends and the settlement system; maintaining/eliminating significant interregional income differentiation, providing social infrastructure, access to social benefits; specialization of regional economies; diversification of economies; transition to a new technological mode; scale and timing of major investment projects proposed by sectoral strategies.

The long-term priorities of Russia's spatial development are enshrined in a number of documents adopted at the federal level. Among them: development of the Far East and Trans-Baikal, North Caucasus, Crimea, Kaliningrad region. The realization of these priorities will require the redistribution of national resources to these regions, the creation of special institutional conditions in them, etc.

Public policy will be essential for the formation of spatial proportions, conducted in relation to the eastern and northern regions of the country, the implementation of the "eastern vector" of the country's development, including the advanced development of the eastern regions, intensification of foreign economic cooperation with the APR countries.

Economic development of the Arctic can be an important factor for long-term development, which will drive the growth of the eastern and northern regions, as well as give push to the development, including, the branches of "new economy" in many Russian regions.

Alternative development opportunities for many regions may arise from the integration processes in the EEU, international cooperation in the framework of the Shanghai Cooperation Organisation — SCO ("North-South" axis).

The recent challenges facing the global and Russian economies require a shift in the assessment of development prospects, so they are also relevant for the Russian regions. Coronavirus pandemic and economic crisis of 2020 significantly changed economic agenda, highlighting the short- and medium-term challenges of the pandemic and economic recovery. Many assessments of the impact of the pandemic have been published, including at the regional level. [12–14] However, the pandemic and the related crisis have not reversed the problems and imbalances in the Russian economy that impeded economic growth, but have only exacerbated them — growth recovery begins with lower starting conditions. [15] The challenges of modernizing the economy will have to be faced with severe resource constraints that significantly reduce the capacity of individual regions to assist, and also requiring a clear and well-founded system of regional priorities.

The climate agenda and transition to a low-carbon economy is becoming a significant factor

[13] Decree of the President of the Russian Federation from 21 July 2020 No. 474 "On national order to development of the Russian Federation for the period up to 2030". URL: https://www.garant.ru/products/ipo/prime/doc/74304210/ (accessed: 22.11.2021).

[14] Challenges and Policy of Spatial Development of Russia in the XXI Century. Moscoe: Society of Scientific Publications KMK; 2020. 365 p.

[15] Post-crisis economic recovery and the main directions of Russia's socio-economic development forecast for the period up to 2035. Moscow: Science; 2020. 152 p.

in the long-term development of the regions. [16, 17] The Government approved the Strategy for socio-economic development of Russia with low-emission gas emissions until 2050.[16] Impacts of climate change are complex and creates a significant risks, particularly to people, infrastructure and a number of economic sectors. On the other hand, climate change provides new opportunities for regions, such as longer navigation periods in the Northern Sea Route, reduction of the heating period, increase in crop productivity and absorption capacity of managed ecosystems.

QUALITATIVE CHARACTERISTICS FOR SCENARIOS

The main factor contributing to the shift in the spatial distribution of production is fixed investment, the changing structure of which affects spatial proportions with a certain lag. In this regard, real changes in the distribution of production as a result of targeted investment policies are evident in the long term.

Taking into account the central role of investment policy, three alternative spatial development scenarios have been developed, based on hypotheses regarding the regional structure and the dynamics of fixed investment.

Conservative scenario combines regional development options that maintain a regional investment pattern close to the 2014–2019 situation. The content of the scenario consists of the long-term trends noted above in the formation of the territorial and sectoral structure of the economy. The scenario assumes that investment policy will remain passive. Targeted impacts will be related only to the implementation national projects, that in this case, the distribution of investments from the federal budget will approximate the territorial proportions of the population distribution.

The conservative scenario will characterize regional dynamics: concentration of the population in the center of the country, most prosperous regions and cities; increasing polarization between rising and depressed regions; preservation of the modern composition of leaders and outsiders of spatial growth; continuation of state support for priority regions; continuation of trends in the distribution of economic activity between the western and eastern parts of the country through increased mining in the eastern regions. The challenges and disparities in spatial development that exist by the beginning of 2020 with high probability to persist and worsen.

Investment and regional policy options considered as a regional investment framework are grouped in two scenarios: based on large agglomerations and natural resource centers that are competitive in world markets,[17] and balanced regional growth.

Development of large agglomerations scenario, based on the fact that the regions in which the agglomerations are located are the most competitive in terms of attracting investment and labour force. It is expected to further concentrate production and income in the most competitive regions from the perspective of the global economy. The priority of maintaining and further developing production centers in demand on the world markets of natural resources remains, this is due to the assumption that the Russian economy will continue to specialize in production and exports in the long term.

The characteristics of regional dynamics are: high level of openness of the Russian economy, significant influence of global trends on spatial distribution of economic activity and specialization of regions; priority in the

[16] Strategy for socio-economic development of Russia with low-emission gas emissions until 2050. Approved by the Order of the Government of the Russian Federation from 29 October 2021 No. 3052-p. URL: http://government.ru/docs/43708/ (accessed: 22.11.2021).

[17] This paper does not discuss the definition of large agglomerations and their boundaries. We proceed from the list of large agglomerations listed in the Strategy of spatial development of the Russian Federation for the period up to 2025. The indicators presented in the forecast refer in general to the subject of the Russian Federation, on the territory of which the agglomeration is located. Thus, large agglomerations are seen only as determining the dynamics and sectoral composition of investment in the region concerned.

development of globally competitive regions, concentration of population and production; change the settlement system by concentrating the population around economic growth centers. The new spatial structure will be formed on large agglomerations connected by a developed system of transport communications.

Scenario assumes production growth, faster development of infrastructure, concentration of human capital, financial resources in the most competitive regions. The development of all other regions on the use of endogenous growth factors, which regions realize in conditions of interregional (and international) competition for resources and markets. Regional policies are expected to focus on increasing the mobility of factors of production, stimulating their concentration in the most competitive regions. The result of this type of spatial growth will be "optimization" of spatial distribution of population and production (by "compression" of it around the centers of economic growth).

Balanced growth scenario includes active investment policies aimed at spatial diversification of growth, establishment of economic growth centers in regions with different types of economies and economies of scale, using advantage of the competitive advantages of each region. For most regions, growth will be based to a large extent on domestic (endogenous) sources and effective use of the potential of interregional interactions. Implementation of infrastructure projects should be aimed at increasing the transport and information connectivity of territories, interregional integration, also improving access to social infrastructure services, improving the quality of the living environment.

Regional dynamics features in a balanced scenario would: multipolarity of distribution of regional and local growth centers; formation of growth centers based on capitalization of development factors (economic and geographical situation, agro-climatic, natural and energy resources, cultural and historical heritage, transit potential, potential for development of foreign economic relations on the basis of cross-border cooperation); preservation of state support for priority regions; "retention" (prevention of compression) of the economic space by maintaining the vital activity of the already developed territories.

Within the scenario the formation of new growth centers in the old industrial regions of the Center, the Volga region, the Urals and Siberia is supposed due to "new industrialization" based on modernization of production and development of new branches "Industry 4.0". Integrated development of the eastern regions of the country will be achieved through major extractive sector projects, also priority financing of the manufacturing sector, transport and social infrastructure. State support for strategic regions will be significant factors determining the regional structure of investments — Far East, North Caucasus, Arctic and implementation of national projects. Economic growth should cover all regions to some extent, and its dynamics, factors and sources may differ from region to region.

QUANTITATIVE CHARACTERISTICS FOR SCENARIOS

Quantitative parameters of the scenarios presented above were estimated on the macroeconomic forecast of the Russian Federation, taking into account the whole range of internal and external conditions of development of the national economy. Model forecasting tools include macroeconomic and interregional models developed in IEF RAS.[18] [18] Two variants of the macroeconomic forecast of the development of the Russian economy became the basis for the estimation of scenario forecasts: basic and target.[19] Under of macroeconomic forecasting sets constraints for the economy as a whole on fixed investment, household final consumption, population and labour resources used,

[18] Russia's economic prospects: forecast to 2030. Moscow: Ankil; 2013. 408 p.

[19] Post-crisis economic recovery and the main directions of Russia's socio-economic development forecast for the period up to 2035. Moscow: Science; 2020. 152 p.

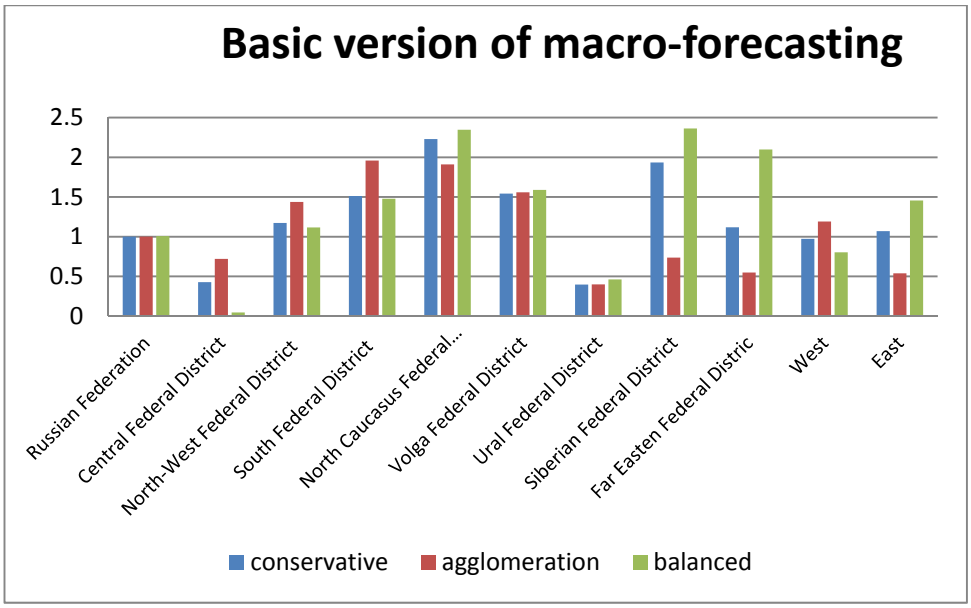

Fig. 1. **Average annual growth rates of GRP of federal districts for the period 2020–2035 when implementing the basic version of the macro forecast, %**

Source: compiled by the author.

distributed across regions according to priorities set in the spatial scenario.

Below are quantitative estimates for six trajectories of regional dynamics, which correspond to the hypotheses on the implementation of each of the three scenarios of spatial forecasting under conditions of low growth of the Russian economy (basic option) and more optimistic assumptions about the development of the country (target option).

Macroeconomic forecasting in the base version assumes that the pre-crisis level (GRP) of 2019 will not be exceeded until 2023, and the next decade will see a low average annual growth rate — 1.1%. Implementation of the basic scenario for the Russian economy may lead to stagnation of production, conservation and aggravation of negative trends in the spatial development of the country. The regional dynamics of the federal districts, corresponding to the above scenarios, in the implementation of the basic macro-prognosis variant are presented at *fig. 1*.

At a low growth rate of the economy as a whole, the development of the regions is determined mainly by inertial trends. Positive GRP performance will be achieved in both the western and eastern regions of the country for all three spatial scenarios, although for some regions and even federal districts the situation is not simple. For the western regions, the agglomeration support scenario maximizes GRP growth, for the eastern regions — in a balanced scenario. In the conservative scenario, the proportions between GRP production in the western and eastern parts of the country remain almost unchanged. In the agglomeration scenario, the trend of shifting production to the western regions of the country continues. Under the balanced scenario, the eastern regions of the country will increase by 2 percentage points by the end of the period compared to the conservative variant.

Real differences in spatial dynamics due to the different structural and investment policy options arise under the assumption of the realization of the target variant of the macroeconomic forecast (*fig. 2*). They relate primarily to the dynamics of the western and eastern regions of the country.

In the large agglomeration scenario, the faster growth of the western regions resulting

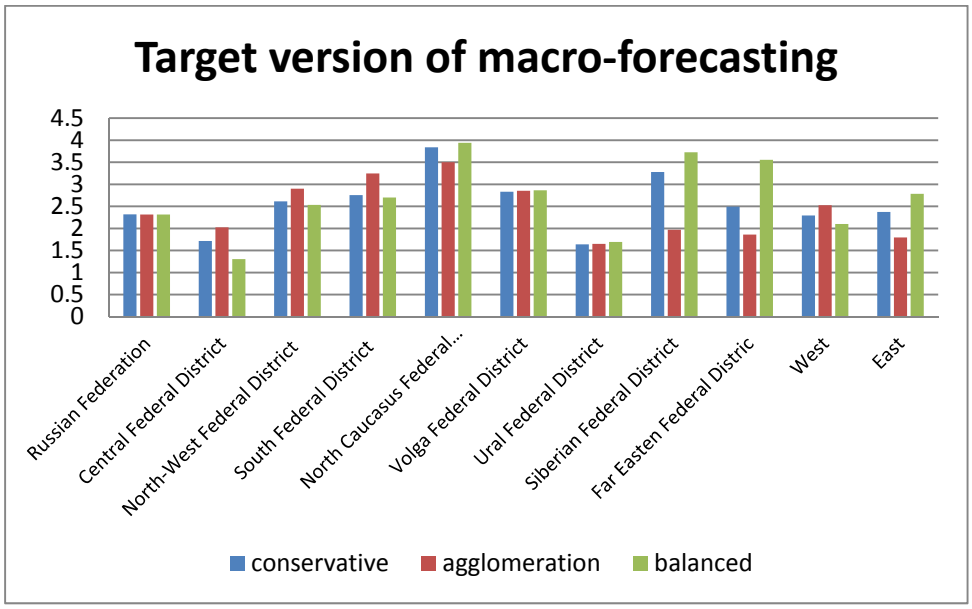

Fig. 2. **Average annual growth rates of GRP of federal districts for the period 2021–2035 when implementing the target version of the macro forecast, %**

Source: compiled by the author.

in further shifts the output and actual final consumption of households from east to west, increasing the gap between Western regions in average per capita final household consumption. The balanced growth scenario assumes a priority in the distribution of investments in favour of the eastern and peripheral regions of the country, which will result in faster growth of the eastern regions.

Comparison of indicators of production and final consumption of the population, dynamics of interregional differentiation of average per capita GRP indicators, spatial diversification of growth shows that a balanced growth scenario is the preferred long-term spatial development option. Structural and investment policy aimed at the implementation of the scenario, allows, on the one hand, to reach the parameters of the macroeconomic forecast, on the other hand, has an advantage over the other two scenarios in terms of redressing the accumulated imbalances in spatial development, solving the long-term geopolitical and strategic problems of the country.

Threats and risks to the implementation of projection scenarios emanating from the external environment (possibility of maintaining or strengthening the sanctions regime, tightening access to external resources, continued decline or stagnation of world commodity prices, deterioration of the economic situation in the country), are identical for all variants. Similarly, there are demographic and investment risks for all scenarios. A balanced growth scenario implies a number of institutional changes, to improve the investment attractiveness of the country as a whole and its individual regions. In particular, it is the formation and creation of new effective models of interaction of power and business, improving the quality of human capital, and the implementation of an active structural and investment policy, without which the targeted variant of macro-prognosis and, accordingly, the balanced variant of the regional forecast cannot be implemented.

CONCLUSION

Use of scenario approach for development of spatial development forecasts allows assessment of long-term consequences of implementation of alternative strategies of development of territories, linking macroeconomic forecasts with

real socio-economic processes in the regions, to identify sources of growth, the nature of which is connected with space, and to identify the most acute problems in the development of regions.

The presented three alternative strategies of spatial development of Russia are based on assumptions about different structural and investment policy options. While maintaining current trends in spatial development as expected in the conservative scenario, continue the shift in population and production distribution to the western and southern parts of the country. The gap between growing and depressed regions will widen. Maintaining normal conditions for the life in strategic and depressed regions at the expense of budgetary resources will require a significant amount of redistribution.

A radical change in the situation is possible only if an active structural and investment policy. The reliance on large agglomerations and export-oriented natural resource centers scenario will lead to significant changes in spatial proportions, population concentration and production around economic growth centers. Increasing interregional differentiation will require active regional policies, aimed, on the one hand, at optimizing the spatial distribution of the population, increasing the mobility of factors of production and stimulating their concentration in the most competitive regions, and, on the other hand, to create compensatory mechanisms to support the outsider-regions.

The balanced growth scenario assumes spatial diversification through the formation of new growth centers, the dynamics, factors and sources of which may differ from region to region. Realization of a balanced option can ensure more even development of all regions, smoothing regional imbalances, "holding" the economic space, creating conditions for reducing interregional differences.

The quantification of alternative scenarios shows that a balanced growth scenario is the preferred long-term spatial development option. Structural and investment policy aimed at the implementation of the scenario, allows, on the one hand, to reach the parameters of the macroeconomic forecast, On the other hand, it has advantages over the other two scenarios in terms of addressing accumulated imbalances in spatial development, long-term geopolitical and strategic objectives of the country. Full realization of the balanced growth scenario is possible under favorable conditions of development of the country as a whole. In additions, it involves additional institutional risks. However, the transition to a balanced spatial growth strategy will require a number of institutional changes and proactive structural and investment policies.

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Integral System of Assessment Indexes of the Military-Industrial Complex Enterprises' Innovative Potential

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ABSTRACT

The aim of this article is a presentation of the methodologies used in the assessment of the innovative potential of the military-industrial complex enterprises. They are based on the integrated index. We achieved this purpose by listing the showings of the innovative potential assessment of the military-industrial complex enterprises, describing methods of their calculation, and reducing them to the consolidated tool. The academic novelty of our study comes down to studying the modern methodologies of the innovative potential assessment based on the integrated index and creating it for the military-industrial complex enterprises. The study results are as follows — integrated methodologies of the innovative potential assessment of the military-industrial complex enterprises and creation of the author's methodology of the innovative potential assessment of the military-industrial complex enterprises based on the innovative potential assessment of the military-industrial complex enterprises.

Keywords: innovation potential assessment; an integrated system of assessment indicators of enterprise innovative potential; methodology of the innovative potential assessment; military-industrial complex; MIC

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The stability of enterprises in leading countries depends on their efficient use of advanced technologies and resources. New scientific developments introduced are objects of intellectual property and their commercialization — the process of promoting innovation from creators to consumers. Enterprise innovation potential — it is the sum of its interrelated, innovative resources that provide procedures for enabling the effective use of these resources and to obtain results of innovation and competitiveness. [1–3] As a diverse characteristic are usually used as indicators for assessing the innovation potential of an enterprise, which are the staff, production and technological, scientific and technical, financial and economic elements of the activity of the enterprise of innovation type. It should be noted, that approaches to assessment of innovation potential and innovation activity of enterprises, published in the scientific literature, are predominantly one-sided and their application is limited to the system of tolerances used in their development and characterized by insufficient consideration of non-economic factors. This seriously reduces the credibility of the assessment results and the applicability of these approaches. The reason for the imperfection of these methods often lies in the wrong methodological approaches of the authors of these scientific works. It is important to provide comprehensive support for assessment of innovation potential of enterprise and introduction of objects into circulation, evaluating all sides of the risk management model. [4]

According to L. E. Basovsky, many economists are mistaken, making unfounded statements due to insufficient of knowledge of scientific methodology, since the choice of methodology (common approaches to the study of the problem) is rather difficult. [5] Furthermore, most of the methods are universal and aimed at industrial enterprises without taking into account the industry specifics of its functioning, while the indicator system should certainly be influenced by the type of product, the nature of the process, the knowledge intensity, etc. Methods that affect enterprises of the defense-industrial complex pay little attention to the fact, that Military-Industrial Complex (MIC) are knowledge-intensive, and this, in turn, affects the calculations and methods of analysis of innovation potential, which is inextricably linked to knowledge intensity, especially in the MIC sphere. [6] Despite the existence of a number of methods to assess the innovative potential of enterprises, received little attention MIC in this context, and those methodologies that take into account this focus of enterprises, have long since become obsolete. This justifies the importance and necessity of developing a methodology for assessing innovation potential at MIC enterprises — modern, taking into account the specific features of enterprises in this industry and based on the analysis of qualitative and quantitative indicators.

Thus, the objectivity of assessment of innovation potential and innovation activity of any enterprise, including MIC, resulted and calculated on qualitative and quantitative indicators. Today, however, there is no single integrated approach to the choice of indicators for this assessment, which is a big problem. Moreover, the establishment of a common framework for the indicators under consideration for further analysis — is a challenging task that has not yet been completed. This postulate is also valid for aggregation of calculated indicators of innovation potential of MIC enterprises into a single (general) indicator. In the absence of a universal method of assessment of innovation potential at the enterprise, the need to develop such a method, taking into account the specific possibilities of its use in each enterprise, which will provide better information for management decision-making.

Today, it is also important to take into account the human factor, the combination of knowledge, practical skills, creativity

and activity of the young generation. The development and use of a new system of indicators for evaluating the effectiveness of innovation activities, providing a full characterization of the activity of enterprises, will influence the adoption of effective managerial decisions. At the same time, in order to develop an integral indicator and simplify calculations, the authors propose to narrow down the system of indicators that characterize the level of innovation activity. [7] In the process of assessing innovation potential and activity, it is quite important to define a system of indicators and their limits. The availability of standards facilitates the evaluation process, while at the same time, dissatisfaction with the existing assessment,— provides guidance for improvement.

Unforeseen economic environment makes it impossible to set specific values to assess the current situation, as they may not be true and may be outdated information. Therefore, in order to assess the innovation potential, the normative values of indicators should be developed based on national industry trends and statistics, which, at this stage of development of the Russian economy, can be used mainly as the limit criteria of the crisis state. Due to the fact that individual enterprises of the industry have their own vision, mission and strategic goals, for more in-depth analysis, it makes sense to refine the proposed indicators by establishing additional, more detailed indicators than those presented in the analysis and specific to the specific environment. When forming a set of estimates it is necessary to choose the most important and objective indicators. Their composition may vary depending on the aspects of the enterprise activity that are most important for the analysis of innovation activity.

Thus, the system of indicators needs to match a number of requirements. Where possible, its components should form a dynamic series so that their current values directly or indirectly influence the values of the remaining indicators. The chosen system will not only allow the assessment of the result, but also the development of a set of measures aimed at improving the defining indicators. In addition, all indicators should be rationed, i.e. for each of them it is possible to present standard values and industry coefficients. They should also be selected so that they can vary within the maximum permissible range.

D. B. Shalmieva and A. D. Abramov consider that the set of indicators depends on the specifics of the enterprise, its experience in the market. [8] The choice of indicators depends, on the one hand, on the significance of the characteristics that ensure the objectivity of the assessment and, on the other,— on the possibility of clearly quantifying them. In the process of assessing the innovation potential of the enterprise, the method first of all needs to assess the significance of the impact of each component of the innovation potential — financial, client; capacity of internal business processes, staff training and development,— and identify a list of indicators to be diagnosed.

The assessment intervals are based on the following considerations. Individual indicators have limits according to generally accepted criteria of economic and financial analysis. However, some indicators are generally not limited, as individual indicators can be set for each enterprise, and in addition, it is difficult to predict how they will change as a result of certain activities.

The *table 1* presents the described method of assessment of innovation potential and innovation activity of enterprise.

The method of assessment of innovation potential and innovation activity proposed in *table 1* contains a minimum, according to the authors of this article, and optimal set of indicators, which are universal for all enterprises.

To calculate the integral evaluation of innovation activity, it is necessary to determine the scores for each of the proposed indicators. The high level of innovation

Table 1

Methodology for assessing the innovative potential and innovative activity of an enterprise

Indicator	Innovative potential of enterprise			
	High	Median	Low	None
Evaluation, points	4	3	2	1
Financial potential				
Investment attractiveness of the enterprise	High	Median	Lower middle	None
Availability of credit	High	Median	Lower middle	None
Profit growth rate, %	> 50	11–49	< 10	-
Financial independence ratio	> 0.6	0.41–0.59	0.35–0.4	< 0.35
Availability circulating assets ratio	> 0.5	0.2–0.5	0.1–0.2	< 0.1
Profitability of innovation, %	> 5.0	2.0–5.0	< 2.0	-
Customer potential				
Degree of satisfaction of the needs	> 90	31–89	11–30	< 10
Consumer demand	High	Median	Lower middle	None
Customer innovation sensitivity	Highly sensitive	Moderately sensitive	Largely sensitive	Insensitive
Level of marketing service development	Advanced specialized service	Lack of marketing specialization	Several general marketers	No marketing department
Staff capacity to generate potential demand	High	Median	Lower middle	None
Potential of internal business processes				
Share of innovative products in industrial output, %	> 50	11–49	< 10	-
Share of universal equipment, %	> 60	31–59	11–30	< 10
Equipment lifetime, years	< 5	6–10	11–15	> 16
Share of fundamentally new equipment, %	> 50	11–49	< 10	-
Fixed assets renewal ratio,%	> 20	11–19	5–10	< 5
Percentage of innovation (technology, equipment)	> 10	5–10	< 5	-
Potential of training and development of enterprise's staff				
Ability of staff to generate new ideas	High	Median	Lower middle	None No
Implementation of retraining and advanced training programmes	Promotion and retraining for all staff	Promotion and retraining of managers and specialists	Promotion and retraining applies only to senior staff	None
Increased external and internal staff flexibility	Programme of measures developed and implemented	Measures relate only to internal staff flexibility	No reinforcement measures are envisaged	None

Source: the authors.

activity is estimated at 4 points, median — at 3 points, lower — at 2 points, and lack of innovation capacity for some indicators is estimated at 1 or 0 points (none). Thus, by the sum of point, can be summarized in a single conclusion the innovative potential.

76–100 points correspond to high innovation potential and high innovation activity, 51–75 — median; 16–50 indicate a inadequacy of innovation capacity and a low level of innovation activity, 0–15 — lack of innovation capacity as such. For an enterprise whose initial characteristics are low, achieving high-level indicators can be a challenging task that involves prioritizing the achievement of goals. [2]

It should be mentioned, that there are many ways and methods of aggregation of private indicators into integral. In view of the above, it is advisable to consider those groups of indicators that are most suitable for use in enterprises of the MIC. It should be noted that modern domestic and foreign scientists have paid enough attention to the problem of innovation potential of enterprises.

The integrated assessment of innovation potential (IIP) is based on the application of a common indicator, which is calculated according to the following formula:

$$\text{IIP} = \sqrt[6]{PE + STE + FE + SE + II + ME}, \quad (1)$$

where PE — production element; STE — science and technology element; FE — financial element; SE — staff element; II — information item; ME — market element.

This approach can be considered effective for the following reason: the enterprise's innovative potential — not just the sum of the elements, but their complex interconnected. The added value of this indicator is that, that the main elements and potentials are presented in as comparable a form as possible.

Another group of indicators was proposed by researcher O. V. Inshakov, author of the evolutionary theory of factors of production, which implies that the production function is a set of several factors necessary for the creation of the product [5], and is as follows:

$$Q = f(Inf, O, Ins, M, T, A), \quad (2)$$

where Q — manufactured product (including innovative); Inf — information; O — organizational; Ins — institutional; M — material; T — technologically; A — human.

The authors focus on the evolutionary theory of factors of production, implying that innovation potential can be considered and calculated as the sum of the factors of creation (production) of innovation listed above. Innovation activity is aimed at the implementation of innovation potential, and its result is represented by the release of innovative products. [9] And for innovation management to be qualitative, it is necessary to assess the groups of performance indicators of R&D, production and management, a new trajectory of advanced development. [10]

Thus, the system of these indicators allows not only to cover all the main production factors of an innovative product, but also to study the main directions of activity of an enterprise within the framework of its production. Moreover, it is the indicators of scientific and technical, production and management activity that are the most important when analyzing the innovation activity of enterprises of the MIC.

The ability to apply these indicators in MIC enterprises is due to the fact that they are engaged in the development, implementation of innovations and the release of innovative products; and proper management of these processes provides an opportunity to increase the effectiveness of the application of innovation potential and to maximize the use of all available factors of production. In terms of performance indicators, it should be noted that if the scientific and technical activity — "supplier" of ideas, the creation of an innovative product takes place at the production, which means — it

is one of the most important directions in enterprises engaged in the production of innovative products, in particular at MIC enterprises. And the fact is important that it is the evolutionary theory of factors gives the opportunity to eliminate the problem of the lack of a common methodology for assessing the innovation potential of any industrial enterprise, including enterprises of the military-industrial complex. For example, Y.S. Sahno presents his view on the development of an integral indicator for the evaluation of innovation potential, where it is proposed to calculate an integral indicator according to the following formula [11]:

$$I = (CI^* CP * i1) + (S * CS * CE * i2) + \\ + (CC * CM * CE * i3) + (CTU * CPR^* i4) \quad (3)$$

where I — coefficient of determining the level of innovation potential of the enterprise; CI — knowledge-intensity coefficient showing the share of R&D expenditure; CP — coefficient of enterprise performance; S — indicator, characterizing innovation of enterprise staff; CS — coefficient of structure of innovative research; CE — coefficient of qualitative evaluation of innovative research; CC — enterprise product competitiveness; CM — market share of enterprise products; CE — coefficient of efficiency; CTU — coefficient of technology upgrade; CPR — coefficient of production renewal; $i1$, $i2$, $i3$, $i4$ — specific coefficients for part of indicators of innovative development of enterprise ($i1 + i2 + i3 + i4 = 1$).

Further, in the framework of this research it is advisable to refer to the exhaustive classification proposed by A.M. Daurov and Z.L. Dzakoyev. These researchers presented a number of indicators that can be conventionally divided into the following resource groups: intellectual, staff, information, marketing, R&D, legal, institutional, material and technical, financial and investment, market, integration, organizational, managerial, organizational, management, productive, economic, social, as well as State support, stimulation, entrepreneurship and competition. [12, 13]

It should be noted that the above indicators are used as part of the expert review of indicators of innovation capacity. The authors of this method consider that this not only helps to solve some problems related to the evaluation of innovation potential, but also gives the opportunity for each case to choose them depending on the goals of the organization. [14] According to the authors of this research, all of them can be applied to MIC, and if there is a need for the most complete assessment of the condition of a particular enterprise, it is advisable to use as many indicators as possible.

It should be noted that the objectivity of assessment of innovation potential of MIC enterprises is based on the analysis of quantitative and qualitative indicators. At the same time, the creation of their system is a very difficult problem, not solved so far. To assess the innovative potential of MIC enterprises, indicators should be based on factors of innovation activity, stages of the life cycle of innovation, the purpose of the enterprise, etc., essentially the innovative potential of MIC enterprises. Although the indicators within these groups are the most complete and accurate from the point of view of the main factors of innovation activity of MIC enterprises, they are not universal. However, this can be mitigated by dividing innovation potential into blocks (elements) for their assessment. [15]

Given the above, the task of assessing the innovation potential of the MIC enterprise, as well as other enterprises, can be solved by combining several indicators to a common denominator (criterion). And since, as already mentioned, today there is no single integrated approach to the choice of indicators for this assessment (which can be considered a big problem), it is possible to estimate the innovation potential of an MIC enterprise by reducing several indicators to a common denominator (criterion). I.E. Karavaev

proposed the following system of indicators of innovation potential of MIC enterprises:

- indicators of the staff of enterprises MIC;
- indicators of material and technical resources provision of R&D processes at MIC enterprises;
- indicators of the level of information support for MIC enterprises;
- indicators describing the patent fund of enterprises and the effectiveness of patent and license security of MIC enterprises.

Considering indicators of factors of production of D. B. Shalmiev and A. D. Abramov and system of indicators of I. E. Karavaev, it can be determined that the first three groups correspond to the proposed by O. V. Inshakov evolutionary theory of factors of production, more precisely, with human, material, technical-technological and information factors of production within the framework of this theory respectively.

Thus, the version of I. E. Karavaev is to some extent a truncated form of the theory of O. V. Inshakov, corrected for differences in indicators. Nevertheless, the fourth group is of particular interest within the framework of the indicators proposed by I. E. Karavaev — due to its uniqueness and characteristics of the indicators.

This set of indicators can be considered distinct and therefore deserves special attention from theorists and practitioners. In other words, the groups of evaluation indicators overlap with the groups of factors in different methodologies for assessing the innovation potential of industrial enterprises (for example, the evolutionary theory of factors of production, proposed by O. V. Inshakov and discussed earlier in this research), but have their own specifics.

Thus, the authors of this research agree with the opinion of E. I. Karavaev [16] that the innovation potential of the enterprises of the MIC should be assessed by calculating private indicators together with their subsequent consolidation into a single indicator (criterion) according to such a formula:

$$EIP = P / IC \rightarrow max, \quad (4)$$

where EIP — effective application of innovation potential; IC — the level of innovation capacity that is measured through private indicators in the groups discussed above.

A clear advantage of this calculation is that there is a symbiosis between performance assessment and the resource approach, that provides an exhaustive characterization of the innovative potential of any enterprise (including MIC), and also gives the opportunity to competently make relevant management decisions. [16]

There are other ways and methods of aggregation of private indicators into integral. The integrated assessment of innovation potential can be so:

$$IP = FP + CP + BP + DP, \quad (5)$$

$$FP = k_f \cdot \sum f, \quad (6)$$

$$CP = k_c \cdot \sum c, \quad (7)$$

$$BP = k_b \cdot \sum b, \quad (8)$$

$$DP = k_d \cdot d, \quad (9)$$

where FP, CP, BP, DP — indicators of ability to innovations of financial potential, client potential, potential of internal business processes and training, and development of staff, respectively;

k_f, k_c, k_b, k_d — number of points according to financial, client potential, potential of internal business processes and staff training and development;

$\sum f$, $\sum c$, $\sum b$, $\sum d$ — weighting ratios, which were assigned to financial, client potential, potential of internal business processes and potential for training and development of staff.

As an economic characteristic, the innovative potential of MIC enterprises is also interesting due to the presence of internal contradictions: increasing

the rate of economic growth, it can impair the economic development of the industry's enterprises by diverting resources to innovation. For this reason, the characteristics of MIC enterprises require the definition of indicators of innovation potential in relation to them. It should also be noted that innovation potential in MIC requires not only the creation of innovations, but also the willingness of the industry to produce them.

In addition, the creation of the new methodology should take into account a number of problems related to the indicators of assessment of the innovative potential of MIC enterprises. This could be achieved, in particular, by decomposing the innovation potential into individual blocks (elements) for further evaluation. In addition, the innovation potential of MIC enterprises should be calculated based on its quantitative and qualitative characteristics.

In this case, the whole set of indicators should be reduced to a single (integral) indicator, which describes the innovative potential of MIC enterprises, for which it is proposed to use the point system and the distribution matrix described below. Indicators should be conventionally divided into four groups: mega-level (world economy level), macro-level (country economy level), meso-level (industry level) and micro-level (enterprise level). All the indicators that characterize the activity of MIC enterprises reflect their device and essence.

Thus, when selecting the indicators for the methodology were applied during the researches of I.E. Karavaev [16], A.M. Daurov, Z.L. Dzakoev [12], A. Triphilova [17], and O.V. Inshakov. [18] Indicators corresponding to the characteristics of MIC companies were also added, which none of the authors have previously used because the MIC industry is specific and has a number of distinctive features. It is on the basis of these features presented in the research of I.A. Baburina and E.E. Gubaidullina [15], the authors of this research propose to use indicators of innovation potential of MIC enterprises within the above groups and subgroups, displayed in *table 2*.

The research showed that many methods of aggregation of private indicators into integral indicators remain.

For the indicators presented above, the authors consider using the *distribution matrix* — a linear diagram, in this case designed to describe the level of innovation potential of MIC enterprises.

This method is characterized by a number of advantages.

First, quantitative indicators measure the existing innovation potential, and the assessment of individual elements and the overall assessment of innovation potential is not the same level of innovation development of the enterprise. Therefore, the author's methodology requires the inclusion of quantitative indicators (as in the methods of other scientists) and qualitative indicators, which are not available in the previously reviewed methodologies. This will allow more accurate identification of innovation potential of the enterprise.

Secondly, there is a need to define the role of each of the elements in the creation of a common indicator of the innovative potential of the knowledge-based enterprise MIC. Therefore, the authors take into account the indicators of the micro, meso, macro and mega-level (the indicators of the latter were not taken into account in any of the methods).

It is proposed to use a point method, presupposing:

- Micro-level indicators assign a multiplier "2";
- Other indicators assign a multiplier "1".

The use of the scoring method is explained by the fact that the micro-level indicators more determine the innovative potential of the enterprise, and meso, macro and mega-level indicators create an environment in which the MIC enterprise has to exist and on which it cannot influence.

Table 2

Indicators for assessing the innovative potential of military-industrial enterprises in the context of subgroups at the micro-level, meso level, macro-level and mega level

Indicator subsets	Indicators within groups and subgroups
Macro-level indicators	
Indicators of macro-economic stability	– Features of conducting research and design work, rules of their implementation and planning, organizational and managerial decisions, as well as the level of their implementation in practice, technical and technological support of research and development work and the timeliness of the delivery of equipment for their implementation. – Provision of R&D material and resources; training of R&D staff and research and development staff. – Average annual output of employees, share of researchers and employees engaged in R&D. – Share of R&D employees with higher qualification, higher education, with secondary education, patent fund (indicators) and effectiveness of patent and license security (economic effect of inventions and rationalization proposals and economic effect of purchased patents and licenses). – Volume of work on patent research (number of patents on development, copyright certificates and patent-clean objects of new equipment, volume of products produced based on these patents)
Innovation performance indicators	– Coefficient of availability intellectual property – CAIP, coefficient of staff development, engaged in innovation – CSD, coefficient of equipment for the innovation sector – CE, coefficient of development of new technology – CDNT, coefficient of development of new product – CDNP, coefficient of innovative growth – CIG, share of innovative products, works, services in the total volume. – Features of involving personnel in the innovation process, the state and methods of stimulating the creation and release of innovation. – Level and presence of innovation risk: cheaper methods of producing goods or services than the methods used, new product or service on old equipment, new product or service creation through new technology
Production performance indicators	– Technological and technical regulations of the production process. – Health and environmental standards and regulations. – Health and safety. – Efficiency of the organization of the production process, including: characteristics of the relationship of management and subordinate, features of interaction of production units. – Level/degree of automation of production, provision of production sites with new equipment and technologies, level of use of equipment that is already in operation: coefficient of intensity of use equipment. – Level of utilization of equipment already available: coefficient of intensity of use equipment. – Product quality and rhythm: level of defect, availability and number of breaks in the production process. – Ability to effectively use all economic resources for the development of innovation, regular accounting; providing comprehensive production reports; analysis and coordination of production to control deviations, delays or reduction of financial public order, therefore, further output is entirely self-produced (risk of termination). – Strict compliance with deadlines, quality standards (products must meet the expected costs). – Timely training of employees employed at the production, the level of qualification of employees creating innovative product. – Ensuring growth of average annual output of employees (indirect indicator of the level of qualification), estimation of proportion of employees with secondary, higher education and employees with higher qualification in production. – Availability of conversion production, a certain share of civilian products in the total output. – Raising the level of staff engaged in specialized activities at enterprises of MIC
Management and organizational performance indicators	– Application in practice of scientific and scientific-practical knowledge and information on the organization of management, creation and maintenance of communication of participants of the innovation project. – Existence and features of explicit job descriptions for management staff, rules designed to regulate the management of innovation. – Features of providing and planning the implementation of the innovative potential of the innovative project, and also control over the process, resources and organizational and communication support for the management process. – Quantitative indicators of management efficiency [sales revenue (profit) per one management employee, management expenditure per 1 ruble sales revenue]. – Planning, standardization, accounting, monitoring and level of computerization. – Raising the level of qualification of managerial staff, level of competence and qualification of managers of different levels (especially – managers of innovative projects) in the implementation of innovation potential of enterprise. – Average annual output of such staff (indirect indicator of the level of qualification), proportion of employees with secondary, higher education in the managerial structure of the organization

Table 2 (continued)

Indicator subsets	Indicators within groups and subgroups
Economic efficiency of enterprise activity indicators	Absolute (difference between project results and implementation costs) and relative (ratio of project cost estimates to total project costs) performance measures: assets, net worth, net profit, earnings, net working capital, profitability
Resource availability indicators	– Financial and investment resources (volume, components, nature of involvement in innovation). – Information resources (quality, volumes, components, nature of involvement in the innovation process). – Intellectual resources (quality, volumes, components, nature of involvement in the innovation process). – Material resources (quality, volume, components and nature of involvement in the innovation process)
Meso-level indicators	
Integration group indicators	Ability of MIC enterprises to cooperate in the field of creation of innovative products (number and quality of connections with other enterprises in the process of creation of innovative products)
Investment performance	Nature and volume of investments attracted to the MIC as a whole
Technological development in the industry indicators	Analysis and assessment in relation to the world level of development
Macro-level indicators	
Institutional environment indicators	Level of development of institutions (innovation infrastructure) ensuring the implementation of innovation activities effectively
State support performance	Features and ways of state support of innovation activity of MIC enterprises
Legal group indicators	The state of legal acts regulating the activity in the innovation sphere and MIC activities, features of the conduct and protection of the defense complex, reflected in the Constitution of the Russian Federation
Social performance	– Condition of the social sphere, its development and functioning. – Consumer price index. – Average per capita monetary income. – Number of unemployed and estimation of crime situation (number of recorded crimes)
Macroeconomic stability indicators	– The presence of sanctions by other states targeting MIC enterprises, which can affect the overall performance of enterprises in the industry and, as a result, reduce the income of enterprises, which, in turn, will spend less different resources on R&D, which will ultimately affect the innovation potential. – Changes in legislation which might have a harmful effect on enterprises or industries, or unfavourable government intervention in the industry, which can be as damaging to innovation as sanctions
Mega-level indicators	
Marketing opportunities indicators	Marketing concepts based on alignment of innovations and demands of the target market in terms of the following criteria: quality, availability and level of advertising and ways of promotion
Market group indicators	Market conditions: situation on the market (offers and needs) of innovative products
Competition performance	Conditions and nature of competition between economic entities. Level of competitiveness of products

Source: the authors.

Table 3

Matrix of the distribution of the level of innovative potential of the military-industrial enterprise

Number of points	Level innovative potential	Necessary to for measures to increase innovation capacity
1–40	Extremely low	Set of measures needed
41–80	Low	Measures is needed
81–120	Median	Some measures are needed
121–160	High	Small changes are needed
161–200	Very high	No need for measures

Source: the authors.

The proposed methodology is new for the current level of development of the methodology for assessing the innovative potential of MIC enterprises. In addition, the application of the methodology in practice implies the solution of existing problems, related to the assessment of innovation potential of enterprises in general and at MIC enterprises.

The method involves the use of a distribution matrix taking into account the fact that the total amount of points in the evaluation of the innovative potential of the MIC enterprise within the proposed methodology is 200. As an example, consider the distribution matrix of the level of innovation potential of the MIC enterprise (*table 3*).

MIC enterprise innovation potential distribution matrix based on *table 3* data, allows you to assert that the level of innovation potential of an enterprise depends on the number of points scored on the basis of its analysis. Depending on the calculated level of innovation potential, MIC enterprises should take or not take measures, aimed to an increase. However, the measures should be aimed at eliminating problems related to those aspects in which 0 points were obtained.

The research should note, that despite the existence of a number of methods to assess the innovation potential of enterprises, including industrial ones, MIC enterprises in this context paid little attention, and the methodologies that take into account this focus of enterprises are long out of date. Therefore, the study proposed a methodology that takes into account the quantitative and qualitative indicators of the mega-level (world economic level) macro-level (country's economy level), meso-level (industry level) and micro-level (enterprise level), which are also reduced to a single (integral) indicator. The matrix of distribution of innovation potential of MIC enterprises allows not only to estimate its level, but also to determine the need to take measures that impact it on "pain points".

In the course of this research, the authors drew the following conclusions.

The scientific literature presents indicators of assessment of innovation potential of enterprises as a whole, less often — industrial enterprises, and practically no indicators (except for the work of E. I. Karavaev) are available to assess the innovation potential of MIC enterprises. Although these methods are applicable to MIC companies, they do not take into account their specifics, because of

which there are errors in the results. Attention should be paid to the situation of aggregation of these criteria into a single indicator (in other words, they are presented in a very narrow range of works).

Based on the aggregate, it is possible to determine whether a particular MIC enterprise under analysis needs to improve its innovation potential, and, if so, in which areas of activity. The proposed method of assessment of innovation potential of MIC and the method of aggregation of private quantitative and qualitative indicators into a single criterion is new and has not previously been proposed either by domestic or foreign researchers.

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