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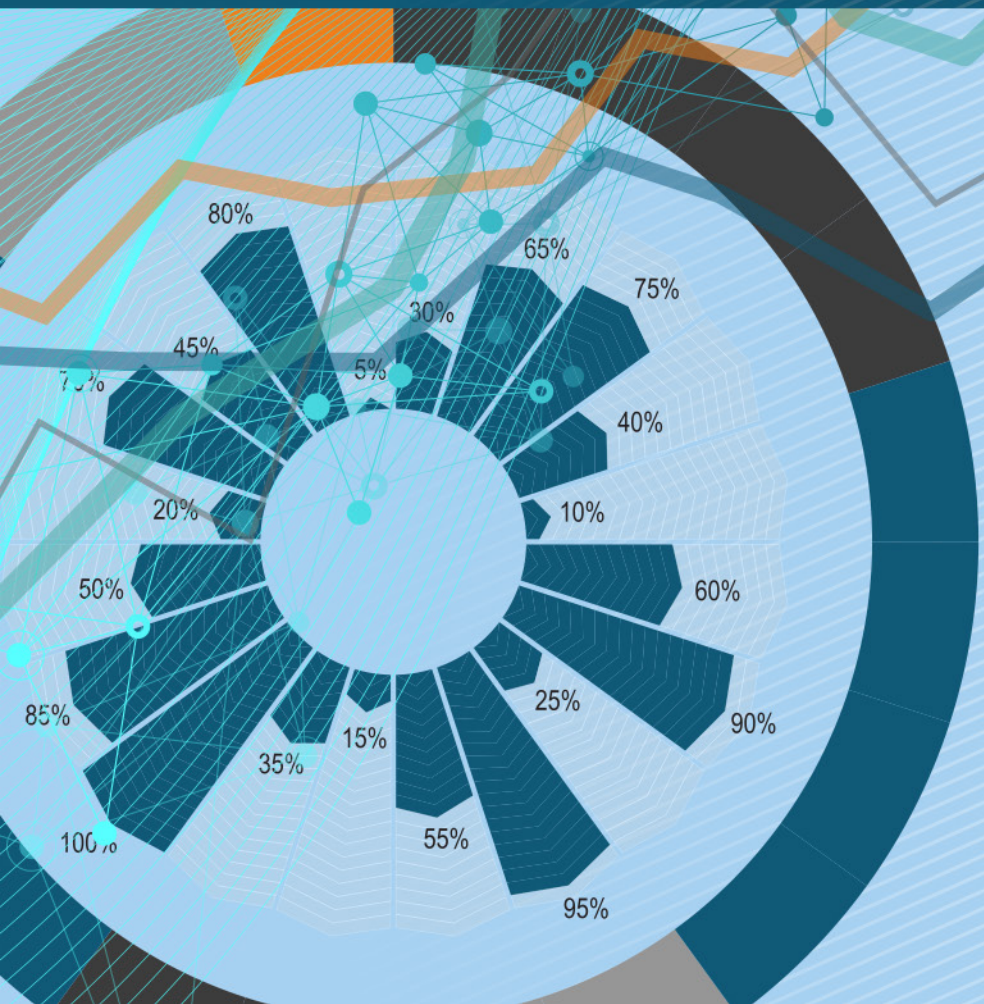

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Contents

Improvement of production and economic activity efficiency as a basic condition for ensuring of domestic production international competitiveness

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ORIGINAL ARTICLE

Abstract. The importance of production and economic activity increasing efficiency is basic condition for achieving the country technological sovereignty and the international competitiveness of domestic production. Therefore, the conditions of tightening market competition in the post-industrial economy determine the relevance of the presented research. Moreover, the collective West makes serious efforts to restrain the intensity of research and development processes in the Russian Federation. They introduce anti-Russian sanctions, including those aimed at limiting the access of domestic enterprises to the latest world scientific developments and technologies and, accordingly, at restricting the sales market for domestic products. Subsequently, the increasing the intensity, effectiveness, and efficiency of domestic enterprises development by enhancement their production and economic activities. The purpose of the research is to identify the issues of improving domestic enterprises operating efficiency as a component of the economic security and country international competitiveness in terms of their effective solutions. Identifying a set of problems allows ones to improve the efficiency of production and economic activity of domestic enterprises. Therefore, the most realistic way to improve their competitiveness, based on increasing labour productivity using the principles of scientific organization of labour, is to increase the profits by reducing the duration of the production and sales cycles. The practical significance of the obtained results concerns with their using by federal and regional authorities for development as so as implement their mechanisms for improving the efficiency of production and economic activity as a basic condition for ensuring international competitiveness of domestic production.

Keywords: increasing efficiency; production and economic activity; basic condition; ensuring international competitiveness; domestic production

JEL codes: D24, E24, J24, O47

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Introduction

Nowadays, the importance of production and economic activity increasing efficiency is basic condition for achieving the country technological sovereignty and the international competitiveness of domestic production. Therefore, the conditions of tightening market competition in the post-industrial economy determine the relevance of the presented research.

At the same time, the traditional main goal is to ensure the national economy growth above the global average (approximately + 4% of GDP per year). Moreover, it contains in all strategic economic development programmes, i.e., «Strategy 2020», «Strategy 2030», etc.

The collective West makes serious efforts to restrain the intensity of research and development processes in the Russian Federation by imposing anti-Russian sanctions, including those aimed at limiting the access of domestic enterprises to the latest world scientific developments and technologies and, accordingly, at restricting the sales market for domestic products.

Hence, the increasing the intensity, effectiveness, and efficiency of domestic enterprises development by enhancement their production and economic activities.

The purpose of the research is to identify the challenges of increasing the production and economic activity efficiency as a basic condition for achieving the country technological sovereignty and domestic production international competitiveness.

Methods

The methodological basis of the research consists of scientific works devoted to the problems of industrial and economic activities of enterprises efficiency improving: Yemelyanov G.V. [7]; Zhaksybaev K.R., Sinkevich N.N., Murykh E.L., Limareva I.G. [8]; Izmalkova I.V., Zvyagina N.N., Polennikova G.I., Tatarenko L.Yu. [10]; Karimova K.S. [11]; Karsuntseva [12]; Mazhul Yu.A. [13]; Mikhailov K.D., Polyushko Yu.N. [14]; Prozorova L.Yu. [17]; Shakina Yu.V., Kazaryan M.T. [23], Shcherbakova S.A. [24], etc.

The scientists give relevant information, analytical and research materials on the problem of ensuring the country technological sovereignty and the domestic production international competitiveness [1, 2, 5, 9].

Results

An analysis of challenges and threats composition to the country's economic security highlighted in Decree of the President of the Russian Federation on May 13, 2017 No. 208 "On the Strategy of Economic Security of the Russian Federation for the Period up to 2030"[1] shows those relations to ensuring the efficiency of production and economic activities in the national economy.

However, the challenge of ensuring the domestic enterprises production and economic activities efficiency. It is largely determined by the level of their development innovation.

The USSR was a recognized world leader in terms of innovative development (the share of R&D costs was the largest one worldwide except the USA and consist about 5% of GDP). Nowadays, the Russian Federation significantly retains the world leaders in these indicators, both in absolute and relative terms.

According to UNESCO, in pre-pandemic 2019, Russia was inferior to the world leader (the USA) in terms of R&D financing in nominal terms ($ bn USD) by more than 14.5 times; to the world leader in terms of the share of the country's GDP allocated to R&D (South Korea) by almost 4 times[2].

Indeed, the issue of the Russian Federation innovative development has been repeatedly posed in strategic policy documents.

The goal in the Concept of Long-term Socio-Economic Development of the Russian Federation for the Period up to 2020 (also known as «Strategy 2020») was set to «transition the Russian economy from an export-based raw material to an innovative socially oriented type of development»[3].

Herewith, the objective was Russia to «occupy 5-10% of the global market for high-tech goods and intellectual services in 5-7 economic sectors»[4].

The next goal of the country innovative development was set in the Decree of the President of the Russian Federation on May 7, 2018. No. 204 «On National Goals and Strategic Objectives of the Development of the Russian Federation for the Period up to 2024», concerning the «acceleration of the Russian Federation technological development» and «increasing the number of organizations implementing technological innovations to 50% of their total number»[5].

However, in the Decree of the President of the Russian Federation on July 21, 2020. No. 474 «On the

[1] *Decree of the President of the Russian Federation on May 13, 2017 No. 208 "On the Strategy of Economic Security of the Russian Federation for the period up to 2030». URL: https://www.garant.ru/products/ipo/prime/doc/71572608 / (Accessed 20.03.2024).*

[2] *World Heritage List Statistics. URL: https://whc.unesco.org/en/list/stat (Accessed 20.03.2024)*

[3] *The Concept of Long-Term Socio-Economic Development of the Russian Federation for the period up to 2020. Approved by Decree of the Government of the Russian Federation No. 1662-r on November 17, 2008. URL: http://static.government.ru/media/files/aaoo FKSheDLiM99HEcyrygytfmGzrnAX.pdf (Accessed 20.03.2024).*

[4] *The Concept of Long-Term Socio-Economic Development of the Russian Federation for the period up to 2020. Approved by Decree of the Government of the Russian Federation No. 1662-r on November 17, 2008. URL: http://static.government.ru/media/files/aaoo FKSheDLiM99HEcyrygytfmGzrnAX.pdf (Accessed 20.03.2024).*

[5] *Decree of the President of the Russian Federation on May 7, 2018 No. 204 «On National Goals and Strategic Objectives of the Development of the Russian Federation for the period up to 2024» (with amendments and additions). URL: https://base.garant.ru/71937200/?ysclid=ltfhclvcx0920336403 (Accessed 20.03.2024).*

National Development Goals of the Russian Federation for the Period up to 2030» the goal of innovative development has changed into «ensuring the Russian Federation among the world ten leading countries in terms of R&D»[6].

However, current global economic crisis is not only a threat but also is a transition to more effective national development. Indeed, scientific and technical development are the components of development determining the state capabilities and prospects of the state globally (Fig.1).

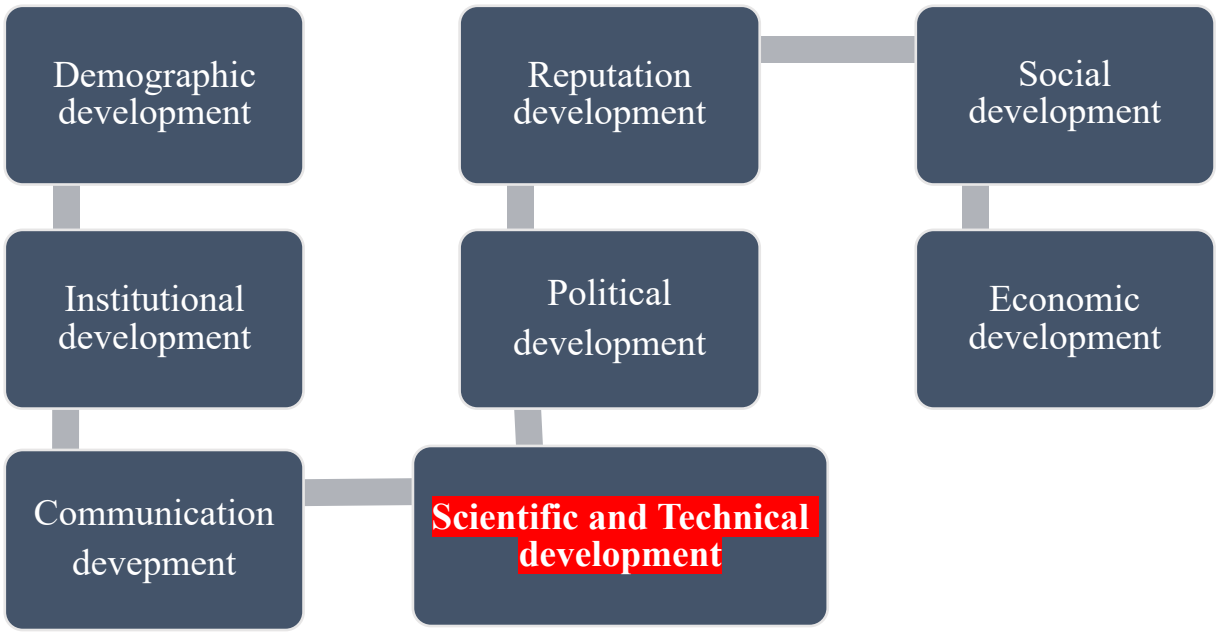

Figure 1. The components of state development determining the capabilities and prospects worldwide
Source: composed by the author

Recently, the market features of the national economy development are characterized by:
- withdrawal of many foreign companies from the Russian market;
- excuse of market niches;
- opportunities for domestic companies to occupy those vacant market niches.

Indeed, sharp excuse of market niches in the domestic economy, due to the withdrawal of Western companies from the Russian market causes contradiction between tactics and strategy to handle with this challenge.

On the one hand, to quickly fill the resulting market gaps, it is necessary to quickly solve the import substitution challenge. It was achieved, also, by implementation of parallel import technology[7].

On the other hand, to localise the dependence on import supplies, a strategic challenge of foreign goods import substitution with domestic ones has arisen. It causes the challenge of ensuring the country technological sovereignty[8], primarily in defense industries[9].

As a result, the domestic economy faced the following set of organizational and economic challenges in terms of import substitution, achieving the country technological sovereignty, and domestic production

[6] *Decree of the President of the Russian Federation on July 21, 2020 No. 474 «On the National Development Goals of the Russian Federation for the period up to 2030». URL: https://base.garant.ru/74404210/?ysclid=ltfhelsly5448465522 (Accessed 20.03.2024).*
[7] *Order of the Ministry of Industry and Trade of the Russian Federation on 19.04.2022 No. 1532 «On Approval of the List of Goods in Respect of which the Provisions of Subparagraph 6 of Article 1359 and Article 1487 of the Civil Code of the Russian Federation do not Apply. Registered with the Ministry of Justice of Russia on 06.05.2022 No. 68421. URL: https://www.consultant.ru/law/hotdocs/75082.html?ysclid=ltfpw892ar393805891 (Accessed 20.03.2024)..*
[8] *On Approval of Priority Directions of Technological Sovereignty Projects and Projects of Structural Adaptation of the Economy of the Russian Federation and the Regulations on the Conditions for Classifying Projects as Projects of Technological Sovereignty. Decree of the Government of the Russian Federation on April 15, 2023 No. 603. URL: http://static.government.ru/media/files/8JsiO5kSItJA1g5IHhGd5qiQVACelECn.pdf (Accessed 20.03.2024).*
[9] *Putin called for ensuring the independence of defense developments from foreign components. URL: https://tass.ru/armiya-i-opk/4573656 (Accessed 20.03.2024).*

international competitiveness:

- focus on parallel imports;
- focus on substitution of Western imports with eastern ones;
- focus on the expectation of foreign companies' comeback;
- low domestic competition.

According to the Secretary of the Security Council of the Russian Federation N. Patrusheva, «parallel imports helped to stabilise the situation in the Russian market. However, the further use of this mechanism should be justified, since it prevents the development of domestic design. Moreover, the absence of justification for further use of the parallel import mechanism, which has largely fulfilled its role in stabilising the situation on the goods market, does not contribute to increasing innovation activity in the real sector of the economy».

A huge organisational and economic challenge of achieving country technological sovereignty is the structural imbalance in the national economy due to state quasi-monopolistic capitalism model implementation. It causes low domestic competition.

Indeed, it is a relevant issue. In the global economy, the normal form of the business pyramid of small and medium-sized businesses contribution to the GDP is 60%. However, the pyramid of domestic business has only 20% of small and medium-sized businesses contribution to the GDP.

The transformation of the business pyramid in the domestic economy from a normal form to an inverted one is a consequence of state quasi-monopolistic capitalism model implemented in the national economy. According to this modes, quasi is a kind of monopoly: almost every region or industry of the country has a single main producer of goods, works, services. This producer is controlled by government agencies, and at least has the possibility of comfort functioning. Although, this mode of functioning is a kind of preference.

Establishing of such preferences in favour of selected companies destroys the competitive environment could be formed by small and medium-sized businesses in almost any industry and region. According to Hernando De Soto, it might cause the appearance of «vicious circle of the shadow economy» [6].

The results of previous studies allowed us to obtain a detailed scheme of the «vicious circle of the shadow sector» by Hernando De Soto. It is shown in Fig. 2 [20].

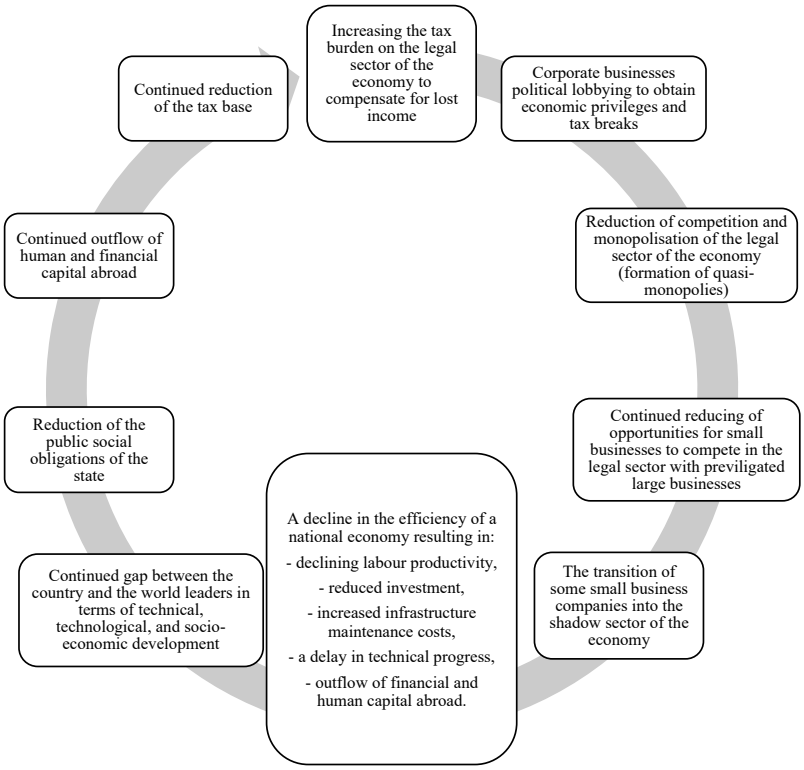

Figure 2. A detailed scheme of the «vicious circle of the shadow sector» by Hernando De Soto
Source: [20]

The detailed form of the inverted pyramid of business in the domestic economy (by contribution to the

country's GDP) is shown in Fig.3.

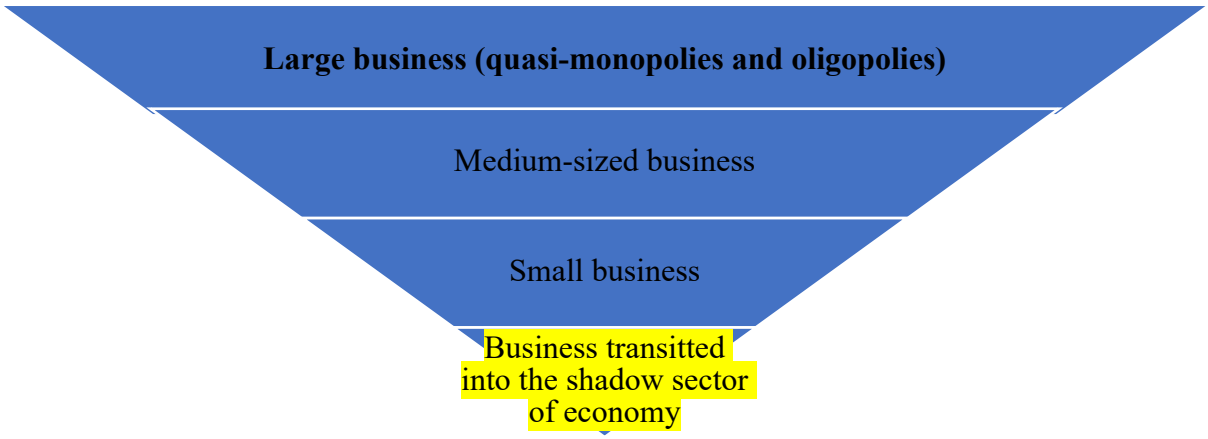

Figure 3. The detailed form of the inverted pyramid of business in the domestic economy (by contribution to the country's GDP).

Source: composed by the author

Therefore, the inverted pyramid of business in the domestic economy (by contribution to the country's GDP) shown in Fig. 3 is an unstable physical structure. Hence, transition of small and medium-sized business into shady ones due to compliance with established (or rather actually implemented) business requirements for these companies costs them more than circumvention of these requirements [6].

Indeed, the main organizational and economic issue of implementing import substitution processes and achieving technological sovereignty for the domestic economy is low domestic competition due to the implementation of state quasi-monopolistic capitalism model. We consider this model in terms of Rusnano activity. Since 2010 Rusnano is a kind of a quasi-monopoly in the field of advanced nanotechnology, which is a core part of the emerging sixth technological order.

On November 19, 2021, Rusnano informed about the onset of a technical default of the company. According to D. Medovnikov, director of the Institute of Innovation Management at the Higher School of Economics: «The development Institute should help the entrepreneur develop and serve him. Firstly, Rusnano interfered in the work of the companies very actively. Sometimes the representatives of Rusnano replaced the vacancies of those companies[10].

For instance, D. Medovnikov notes: «This is the style of a predatory aggressive corporation, not a development institute»[11].

Moreover, the expected result of Rusnano activities as a quasi-monopolistic structure was obvious to specialists before its operation began in 2011.

The director of the Institute of Market Problems of the Russian Academy of Sciences, academician N. Ya. Petrakov noted: «Either charlatans or American spies will come to Skolkovo»[12].

The key problem of increasing the efficiency of production and economic activities in the interests of achieving technological sovereignty of the country is the action of the so-called «Bermuda Triangle» of the Russian economy (Fig.4) [21].

For instance, key interest rate plays a crucial role in the development of the national economy (Fig.4). We refer to its model representation based on analogy with the band theory of solid conduction (Fig.5).

An illustration of the impact of the Central Bank's key interest rate growth on reducing the possibilities of industrial activity of enterprises, by analogy with the band theory of solid conduction (Fig.5) is shown in Fig.6.

[10] *The story of the failure: Anatoly Chubais or how Rusnano wastes 280 billion rubles. URL: https://www.kp.ru/daily/28362.5/4510611/ (Accessed 20.03.2024).*

[11] *The story of the failure: Anatoly Chubais or how Rusnano wastes 280 billion rubles. URL: https://www.kp.ru/daily/28362.5/4510611/ (Accessed 20.03.2024).*

[12] *Nikolai Petrakov: «Either charlatans or American spies will come to Skolkovo.» URL: https://www.business-gazeta.ru/article/32844 (Accessed 20.03.2024).*

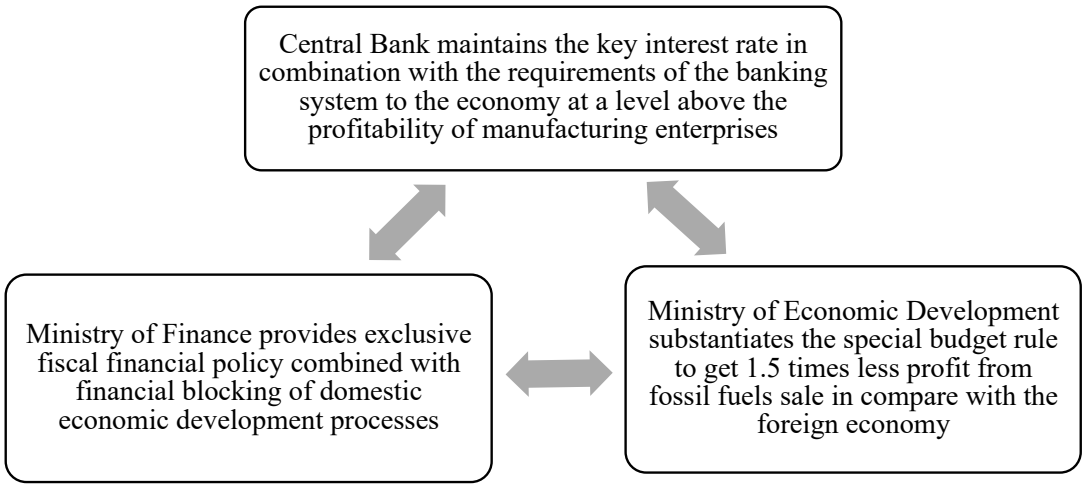

Figure 4. The Bermuda Triangle of the Russian economy

Source: [32]

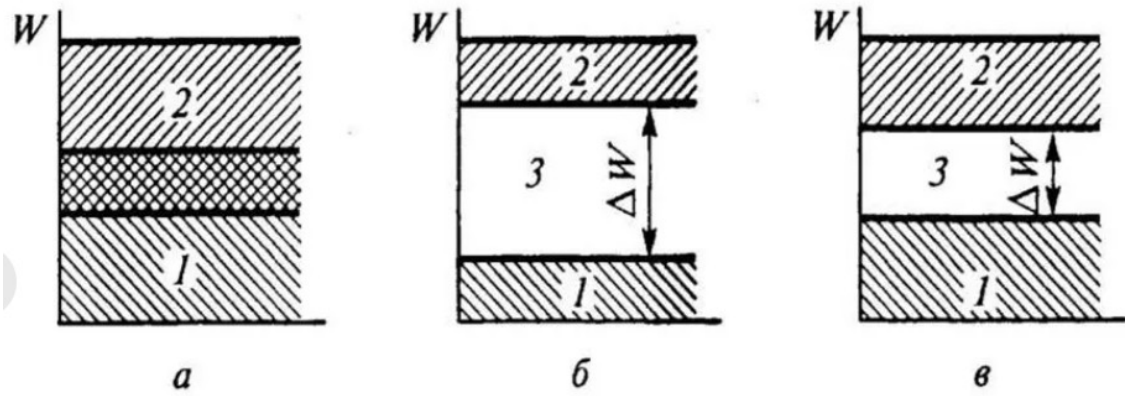

Figure 5. A model representation of the key interest rate role in the national economy development, based on analogy with the band theory of solid conduction, including: a) conductors, b) dielectrics, c) semiconductors

Symbols: 1 – valence band; 2 – conduction band; 3 – band gap width ΔW

Source: composed by the author

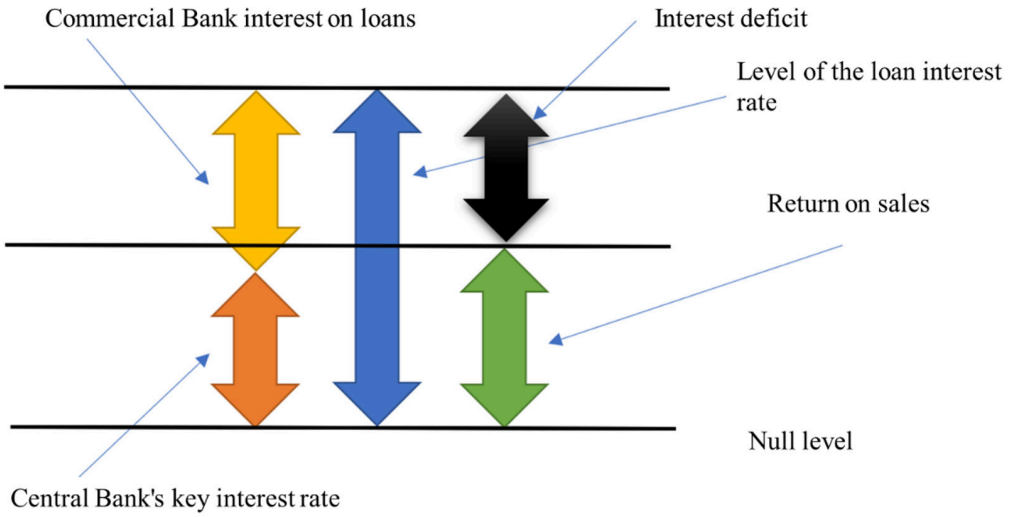

Figure 6. An illustration of the impact of the Central Bank's key interest rate growth on reducing the possibilities of industrial activity of enterprises

Source: composed by the author

Consider financial and economic processes by analogy with the solids conduction. We can note the upper boundary of the valence band (VB_{UB}) as the level of return on sales (R_S) of the enterprises, and the lower boundary of the conduction band (CB_{LB}) as the value of the loan rate (L_R) for enterprises. In the most general form they can be represented as the sum of the Central Bank's key interest rate ($KIR_{CentBank}$) and interest on loans added by a credit institution, for example, a commercial bank ($IL_{ComBank}$) [22]:

$$L_R = KIR_{CentBank} + ILR_{ComBank}, \quad (1)$$

Indeed, the ideal (or rather normal) economical situation in the economy occurs when the upper boundary of the valence band (VB_{UB}), reflecting the level of profitability of sales (R_S) of enterprises, exceeds the lower boundary of the conduction band (CB_{LB}), reflecting the average loan rate (L_R) for enterprises [22]:

$$R_S > L_R, \quad (2)$$

which corresponds to the conductivity in solids of the conductor type.

On the other hand, disadvantaged economic situation occurs when the upper boundary of the valence band (VBUB), reflecting the level of return on sales (R_S) of enterprises, turns out to be significantly lower than the boundary of the conduction band (CV_{LB}), reflecting the average loan rate (L_R) for enterprises [22]:

$$R_S << L_R, \quad (3)$$

which corresponds to the nature of conductivity in dielectric-type solids.

In fact, that most business entities cannot use loans.

Nowadays, within domestic economy the upper boundary of the valence band (VB_{UB}), reflecting the level of return on sales (R_S) of most enterprises is below the boundary of the conduction band (CB_{LB}), reflecting the average loan rate (L_R) for enterprises [22]:

$$R_S < L_R, \quad (4)$$

which corresponds to the nature of conductivity in semiconductor-type solids.

Indeed, this challenge has existed for a long time. In 2015 in report «On urgent measures to strengthen Russia's economic security», academician S. Yu Glazyev noted: «only a fifth of industries have a return on sales above the current level of the average interest rate» (Fig.7) [4].

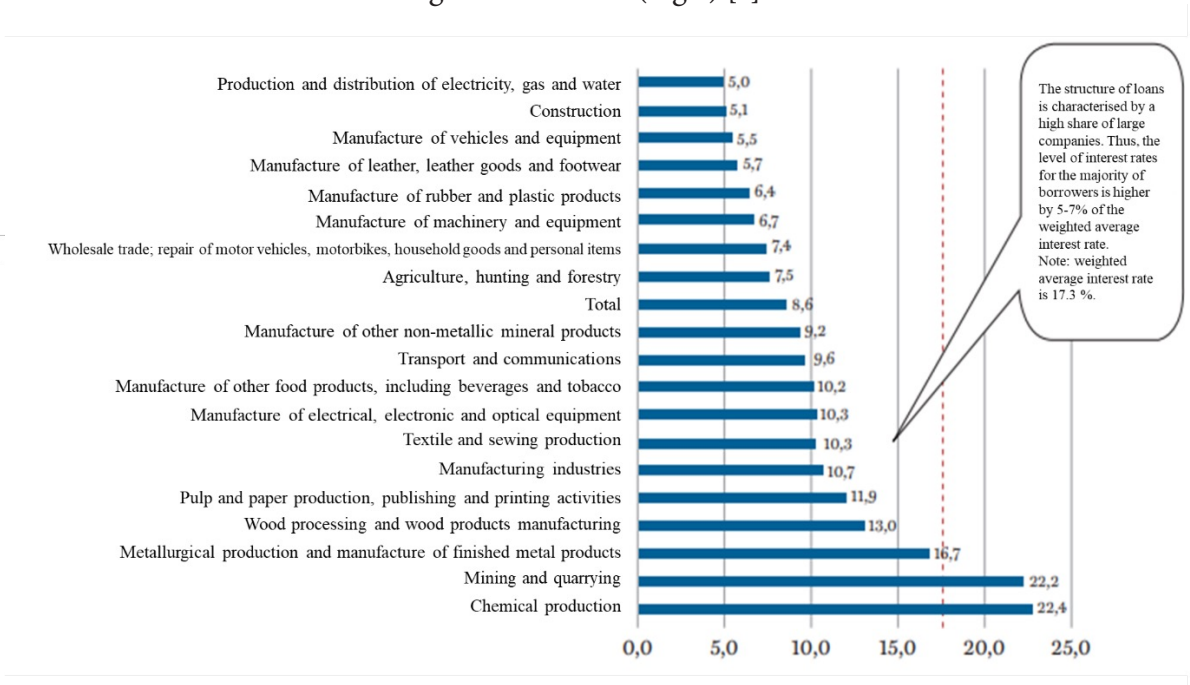

Figure 7. The weighted average interest rate made impossible lending for most non-financial economic sectors [4] (except for extractive industries)

Source: [4]

Conclusions

Therefore, we can consider two development vectors allowing to overcome the challenge of increasing

production and economic activities to achieve technological sovereignty and the international competitiveness of domestic products (Fig.8).

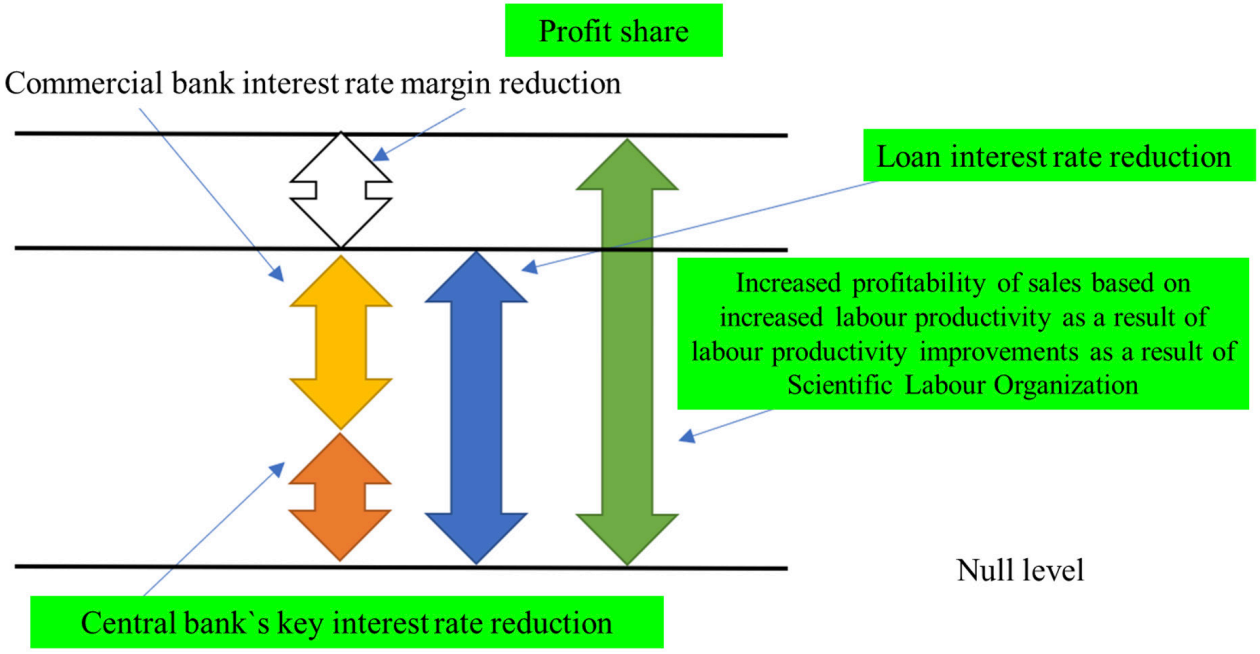

Figure 8. Ways for overcoming the challenge of increasing production and economic activities to achieve technological sovereignty and the international competitiveness of domestic products
Source: composed by the author

On the one hand, it consists in the reduction of the Central Bank's key interest rate, which entails a decrease in the interest surcharge on loans from commercial banks. Consequently, it causes a decrease in the key interest rate on loans for non-financial organizations.

On the other hand, it ensures the return on sales growth based on an increase in labour productivity as a result of Scientific Labour Organization. In the 1920s this principle was formed by A.K. Gastev [3]. Subsequently, Taiichi Ono [15] and Shigeo Songo [18] laid it into the foundation of lean manufacturing concept.

Nowadays, it is not possible to expect a significant reduction in the key interest rate from the Central Bank of the Russian Federation[13]. However, the most realistic way to improve the domestic production competitiveness is to increase labour productivity based on the principles of Scientific Labour Organization. It allows ones to increase return on sales and profits by reducing the duration of the production and sales cycle.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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Labour resources under conditions of military danger as a key factor in increasing industrial potential

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ORIGINAL ARTICLE

Abstract. The article examines the problem of mobilising the industrial potential of Russia in terms of the growing military danger during SMO under decrease in the demographic and labour potential of the Russian Federation. The authors emphasize the effective involvement of labour resources is a key element for development of the industrial potential. Those are necessary to counter the increasing escalation of the military conflict and the desire of Western countries for military and political defeat of Russia. However, the reduction of labour potential and the aging of the population can cause serious socio-economic and political problems. A liberal approach to migration poses long-term threats to the State. Unregulated migration processes will inevitably cause an increase in unemployment, a decrease in the share Russian nation itself, loss of national identity, social tension, and cultural, ethnic, and religious conflicts. It requires a thorough systematised approach and effective monitoring of demographic trends. The state should find a balance between attracting labour from outside and increasing its own labour resources. It also should provide the rational use of existing labour resources.

Keywords: labour resources, industrial potential, migration, population, highly qualified personnel, mobilization economy, scientific potential, military danger, escalation of armed conflict, migration policy

JEL codes: B10, B50, D11, E21, E71

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Introduction

Increasing industrial production in terms of the urgency to mobilise Russia's industrial potential according to the current military-political situation of further escalation of the armed conflict in Ukraine is possible only with the effective involvement of labour resources in production. Russian historical experience shows the ability of human resources to compensate a shortage in the financial and technical spheres even in a critical situation. Indeed, the absence of qualified specialists and employees cannot be compensated in a short time. A crisis does not allow State to compensate the shortage of labour resources in the industrial sector rapidly through production automation. Therefore, it requires time and significant financial flows. The production automation is complicated due to economic sanctions against our country. It is not impossible to purchase the necessary machinery abroad. Therefore, it takes a lot of time and highly qualified specialists to incorporate domestic high-tech facilities.

Our previous studies concern with the requirement for a qualitative increase in Russian industrial potential and relevance of expanding and upgrading of production capacities [1-2]. This study also considers the issues of labour resources. Those correlate with the demography and population of Russia. However, the development of industrial potential and demography are closely related. The population is one of the main factors determining the size and quality of labour resources. It also provides demand for goods, services, and

resources for production. Moreover, the development of industrial potential affects the regional economy, new jobs, unemployment reduction, and improvement of living conditions. In turn, the increase in the number of employees stimulates investment and development of regional industrial sectors.

Hence, the effective use of human potential allowed the USSR to achieve the large-scale strategic goals. Previously, we analysed the USSR achievements in details [1-2]. However, it is impossible to transfer previous historical experience to modern realities. Digitalisation and scientific and technological progress significantly changed the economic situation and production cycles. Nevertheless, the labour force remains a key factor in production. Consequently, the analysis of labour resources structure and efficiency, increasing of Russia industrial potential to counter the measures taken by the countries of the Western anti-Russian coalition are of the great importance.

Main part

1. Labour resouces of the Russian Federation

Untrained and unskilled labour is the most widespread and mobile resource. This kind of work does not involve long and complex qualification training. Thus, people involved in it can be redirected to various industrial sites without loss of productivity. Indeed, it is sufficient to provide the necessary instruction and minimal professional training of the personnel. Those costs associated with this kind of rotation should be covered by the State. In the conditions of a mobilisation economy, the advantages of unskilled labour become especially valuable; they allow ones to concentrate production forces on the implementation of priority goals in a short time.

The other most significant part of the labour force for the country's economy is undoubtedly the intellectual and scientific and technical elite. It plays a key role in the industrial potential of any state, ensures the development and competitiveness of national industries, and stimulates economic growth and innovative development of the country. Nowadays, under the Western sanctions, the importance of increasing the efficiency of highly qualified labour resources is particularly acute for the Russian Federation [2].

The skilled labour is the basis of the technical, technological, and economic development of society. According to A. Smith, the level of wages in a country is an indicator of its economic development. This is the prerogative of skilled labour (productive and high-qualitative enough) to provide significant effectiveness for social progress [3, p. 81].

Although, it is possible to identify some significant issues of using intellectual resources limiting the development of the Russian economy. In particular, there is a trend of outflow of highly qualified specialists abroad, especially managers and engineering specialists.

Rosstat provides information on specialists emigrated from Russia categorizing them according to their specialism profiles and level of training (Tables 1, 2).

Table 1 – The number of Russian citizens moved abroad, by occupations and positions, persons

Years	2010	2015	2019	2020	2021	2022
The total number of citizens, persons	**70,236**	**57,138**	**57,638**	**45,463**	**53,149**	**55,597**
including:						
managers	13,068	14,416	15,715	11,811	15,389	16,165
specialists	20,069	20,835	19,832	16,867	18,985	19,205
of these:						
in the field of engineering and technology	14,799	16,229	14,584	13,323	14,389	14,798
engaged in the maintenance and repair of computer equipment	96	20	30	42	46	58
in the field of healthcare	113	27	52	43	20	55
in the field of culture and art	683	282	172	44	50	66
educational, teaching staff	238	20	18	5	24	26

Years	2010	2015	2019	2020	2021	2022
other	4,140	4,257	4,976	3,410	4,456	4,202
workforce	23,606	19,151	19,860	15,879	17,756	18,901

Source: Labour and employment in Russia, 2023

Table 2 – The number of Russians mover to work abroad, by level of education, persons

Years	Persons					as percentage of total				
	2015	2019	2020	2021	2022	2015	2019	2020	2021	2022
Total, persons	**57,138**	**57,638**	**45,463**	**53,149**	**55,597**	**100**	**100**	**100**	**100**	**100**
of these have an education:										
higher	27,775	32,618	25,850	30,364	32,956	48.6	56.6	56.9	57.1	59.3
vocational secondary education	21,627	19,211	15,274	17,737	18,352	37.9	33.3	33.6	33.4	33
secondary general education	6,583	5,704	4,121	4,812	4,166	11.5	9.9	9.1	9.1	7.5
do not have secondary general education	1,153	105	218	236	123	2	0.2	0.5	0.4	0.2

Source: Labour and employment in Russia, 2023

According to the analysis, the emigrated labour force has been decreasing between 2010 and 2020. However, since 2020, there is a trend of brain drain abroad and the percentage of emigrants with higher education has been growing.

Indeed, in this economic and political situation this trend complicates the mobilisation of resources, slows down economic growth, and becomes a serious challenge for the State.

It is not ready to actively restore the rapidly lost scientific and technical potential. This is evidenced by the low investments into R&D and scientific sphere (Table 3).

Table 3 – Financing of science from the federal budget, mln RUB

Years	Science costs from the federal budget, mln RUB	of these, the cost of basic research, mln RUB	of these, the cost of for applied scientific research, mln RUB	as a percentage of federal budget costs, %	as a percentage of GDP, %
2000	17,396.40	8,219.30	9,177.10	1.69	0.24
2005	76,909.30	32,025.10	44,884.20	2.19	0.36
2010	237,644.00	82,172.00	155,472.00	2.35	0.51
2011	313,899.30	91,684.50	222,214.80	2.87	0.52
2012	355,921.10	86,623.20	269,297.90	2.76	0.52
2013	425,301.70	112,230.90	313,070.80	3.19	0.58
2014	437,273.30	121,599.50	315,673.80	2.95	0.55
2015	439,392.80	120,203.80	319,188.90	2.81	0.53
2016	402,722.30	105,247.60	297,474.70	2.45	0.47
2017	377,882.20	116,977.60	260,904.60	2.30	0.41

Years	Science costs from the federal budget, mln RUB	of these, the cost of basic research, mln RUB	of these, the cost of for applied scientific research, mln RUB	as a percentage of federal budget costs, %	as a percentage of GDP, %
2018	420,472.30	149,550.00	270,922.30	2.52	0.40
2019	489,158.4	192,495.00	296,663.10	2.69	0.44
2020	549,602.20	203,246.80	346,355.40	2.41	0.51
2021	626,574.30	225,152.70	401,421.60	2.53	0.48
2022	631,701.60	247,286.90	384,414.80	2.51	0.41

Source: Rosstat. Science, Innovation and Technology. Financing of science from the Federal Budget (since 2000)

Moreover, this kind of labour resources have a low mobility. Well trained specialists are not ready to move to other country regions to find a job. Therefore, some regions have a shortage of specialists, and vice versa. It also reduces the efficiency of using their own potential and industrial potential of the State.

However, there is another significant category. It includes a wide range of professions and specialties involved in other economic sectors. For instance, specialists employed in educational institutions, medical workers, service sector employees, and other specialists providing the high-quality functioning of society. They are an integral part of the social sphere and labour resources; their quality directly affects the level of industrial potential of the State.

According to Rosstat, the employment structure in Russia is as follows (Table 4).

Table 4 – The average annual number of people employed in Russia by type of economic activity, in % of the total

Years	2017	2018	2019	2020	2021	2022
Total, %	100.0	100.0	100.0	100.0	100.0	100.0
of these, by type of economic activity:						
Agriculture, forestry, hunting, fishing, and fish farming	7.1	6.9	6.7	6.5	6.3	6.3
Mining	1.6	1.6	1.6	1.6	1.6	1.7
Manufacturing industries	14.2	14.1	14.0	14.0	14.1	14.0
Provision of electric energy, gas and steam; air conditioning	2.3	2.3	2.3	2.3	2.2	2.2
Water supply; sanitation, waste collection and disposal, pollution elimination	1.0	1.0	1.0	1.0	1.0	1.0
Construction	8.8	8.9	9.0	8.9	9.2	9.2
Wholesale and retail trade; repair of motor vehicles and motorcycles	19.0	19.1	19.0	18.8	18.7	18.6
Transportation and storage	7.3	7.5	7.6	7.8	8.0	8.1
Activities of hotels and food service companies	2.3	2.4	2.5	2.5	2.6	2.6
Information and communication activities	2.0	2.0	2.1	2.2	2.2	2.3
Financial and insurance activities	2.0	1.9	1.9	1.9	1.8	1.8

Years	2017	2018	2019	2020	2021	2022
Real estate activities	2.7	2.7	2.7	2.7	2.7	2.6
Professional, scientific and technical activities	4.1	4.0	4.0	3.9	3.9	3.9
Administrative activities and related additional services	2.6	2.7	2.8	2.8	2.9	2.9
Public administration and military security; social security	5.2	5.1	5.1	5.2	5.1	5.0
Education	7.7	7.6	7.6	7.7	7.5	7.4
Health and social services	6.2	6.2	6.2	6.3	6.3	6.2
Culture, sports, leisure, and entertainment	1.6	1.6	1.6	1.6	1.6	1.6
Other services	2.3	2.3	2.3	2.3	2.2	2.4

Source: Rosstat. The average annual number of people employed in Russia (by enlarged types of economic activity)

Hence, Russian resource structure is well-organised and does not fluctuate much over the past six years. It indicates the stability of the economic situation and the well-organised structure of economy before the SMO.

However, the conditions of peacefull time and the SMO period are different ones. Part of consisting the country's labour potential is forcibly withdrawn from the economy to be included in the active army service; some workers voluntarily leave their work to protect the motherland. It causes serious difficulties in replacing outgoing labour resources, training them. It also raises issues of demography and migration as factors of replacing declining labour resources and providing them to ensure the necessary labour and industrial potential. However, these decisions threaten to the Russians and require special research.

2. Demography as a factor in the formation of labour resources for the economy and the military-industrial complex

The issue of population size, especially the national one, is extremely relevant for our country. Despite Russia is the largest country in the world, its population is not very large, especially, in terms of working-age population.

The demographic situation in Russia can be characterized by the following trends:

- birth inclination;
- increased mortality rate;
- aging of a nation;
- decrease in percentage of working age population;
- reduction of the ethnic Russians;
- migration.

In the Demographic Almanac of Russia for 2023, Rosstat presented the population natural growth, 1990-2022 (Table 5).

Table 5 – Births, deaths, and natural population growth, persons

Years	Total, persons			
	born	dead	of these, those who died under the age of 1 year	natural growth
1960	2,782,353	886,090	102,040	1,896,263
1965	1,990,520	958,789	53,798	1,031,731
1970	1,903,713	1,131,183	43,511	772,530

Years	Total, persons			
	born	dead	of these, those who died under the age of 1 year	natural growth
1975	2,106,147	1,309,710	49,806	796,437
1980	2,202,779	1,525,755	48,500	677,024
1985	2,375,147	1,625,266	49,381	749,881
1990	1,988,858	1,655,993	35,088	332,865
1995	1,363,806	2,203,811	24,840	-840,005
2000	1,266,800	2,225,332	19,286	-958,532
2001	1,311,604	2,254,856	19,104	-943,252
2002	1,396,967	2,332,272	18,407	-935,305
2003	1,477,301	2,365,826	18,142	-888,525
2004	1,502,477	2,295,402	17,339	-792,925
2005	1,457,376	2,303,935	16,073	-846,559
2006	1,479,637	2,166,703	15,079	-687,066
2007	1,610,122	2,080,445	14,858	-470,323
2008	1,713,947	2,075,954	14,436	-362,007
2009	1,761,687	2,010,543	14,271	-248,856
2010	1,788,948	2,028,516	13,405	-239,568
2011	1,796,629	1,925,720	13,168	-129,091
2012	1,902,084	1,906,335	16,306	-4,251
2013	1,895,822	1,871,809	15,477	24,013
2014	1,942,683	1,912,347	14,322	30,336
2015	1,940,579	1,908,541	12,664	32,038
2016	1,888,729	1,891,015	11,428	-2,286
2017	1,690,307	1,826,125	9,577	-135,818
2018	1,604,344	1,828,910	8,244	-224,566
2019	1,481,074	1,798,307	7,328	-317,233
2020	1,436,514	2,138,586	6,489	-702,072
2021	1, 398, 253	2, 441, 594	6,516	-1, 043, 341
2022	1, 304, 087	1, 898, 644	5,876	-594,557

Source: Demographic Almanac of Russia, 2023

The natural population decline in 2020 reached to 702 thousand people, and in 2021 reached 1.04 mln people. It was the maximum in the history of the modern Russia. Mortality in 2021 increased by 14.2% and reached 2.44 mln people. The main reason was the COVID-19 pandemic. The birth rate in 2021 decreased by 2.7% and reached to 1.4 mln people – at least since 2002.

In 2022, 1,304,087 people were born in Russia, which is 6.7% less than in 2021. Last year 1,898,644 people died, which is 22.2% less than in 2021.

According to the table, mortality has significantly decreased in 2022. However, it still exceeds the birth rate. Therefore, we can note a demographic crisis and tendency to the national ageing.

The sharp decline in the birth rate at the end of the 20th century causes the decrease of number of children in Russia. It resulted in decreasing of the population over working age. The retirees in Russia decreased after the pension reform. The working age limit was increased to 5 years. The replacement rate in

2023 is 18.1%. Before the reform began in 2018, there were 553 retirees per 1,000 workforce.

Moreover, the issue of the increase in the economic burden on the working-age population due to the rapid growth in the share of retirees is of the particular concern (Table 6).

Table 6 – Share of retirees in the total population, %

Years	Total, persons, %	including at the age of, %		
		60-64	65-69	70 and older
2008	100.00	2.25	1.14	0.41
2009	100.00	2.57	0.94	0.43
2010	100.00	2.95	0.74	0.37
2011	100.00	3.30	0.76	0.35
2012	100.00	3.38	0.82	0.27
2013	100.00	3.44	0.91	0.23
2014	100.00	3.60	0.95	0.18
2015	100.00	3.79	1.05	0.16
2016	100.00	3.90	1.10	0.16
2017	100.00	3.89	1.23	0.34
2018	100.00	4.12	1.33	0.40
2019	100.00	4.30	1.48	0.45
2020	100.00	4.63	1.50	0.43
2021	100.00	4.96	1.47	0.41

Source: Labour force, employment and unemployment in Russia (based on the results of labour force sample surveys), 2022

The increasing of social costs to support the infrastructure serving the elderly population may require a sharp increase in the tax burden on the economy or cause the collapse of the pension system. It will provide acute socio-economic and political challenges [4, p. 114].

Indeed, population ageing will cause a decrease in the birth rate, an increase in mortality and morbidity of the population, negative impact on the national health care system, etc.

The general health of working-age population is deteriorating. Accordingly, professional and qualification characteristics are becoming outdated, mobility and susceptibility to change are decreasing, etc. Figure 1 shows the average age of the employed workforce according to Rosstat[1].

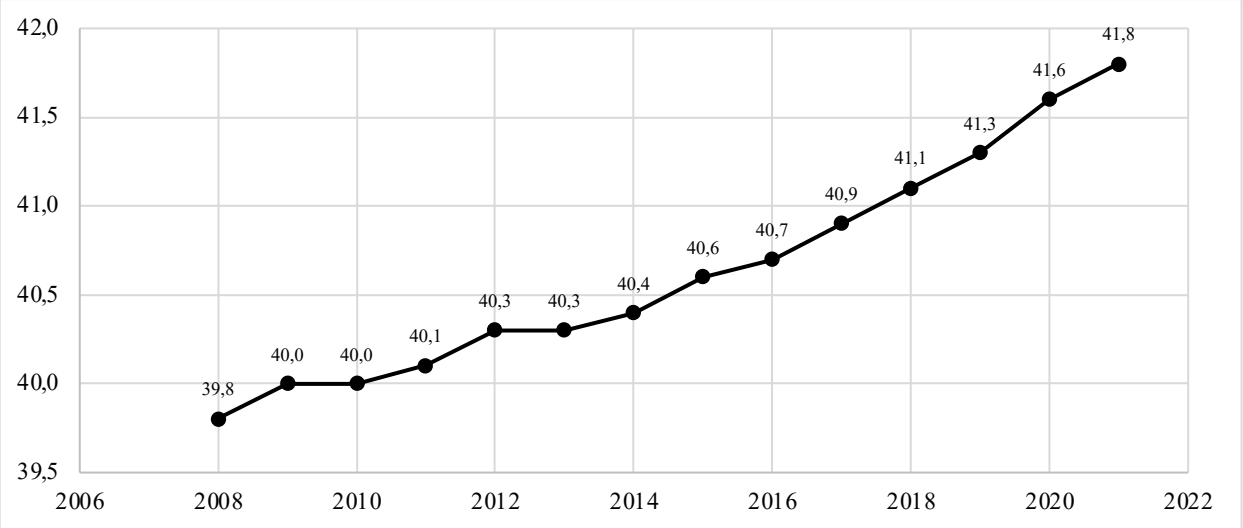

Figure 1. Average age of employees, years

Source: Labour force, employment and unemployment in Russia (based on the results of labour force sample surveys), 2022

[1] *Labour force, employment and unemployment in Russia (based on the results of labour force sample surveys), 2022*

The decline in the number, share, and ageing of this part of the population significantly reduces labour potential both quantitatively and qualitatively. Indeed, it makes the implementation of an optimistic scenario of economic growth very problematic.

Moreover, the reduction of demographic and labour potential decrease the State mobilisation potential.

A decrease in the number of young men of conscriptional age, fit for health reasons to serve in law enforcement agencies, is a threat to the country's defence capability. It definitely complicates the protection of country borders and internal stability [4, p. 114].

3. Issues of labour resources migration replacement in the Russian Federation

The shortage of human resources, the forced reduction in the number of law enforcement agencies could contribute to the activation of terrorist groups, territorial claims against Russia, an increase in the flow of illegal migrants and drug trafficking. All of these could jeopardise the very existence of the country.

Since 2016, there has been a steady decline in natural population growth. Data for 1990-2022 are presented in Table 7.

Table 7 – Components of the change in the total population, thousand persons

Years	Population as of January 1	Changes over the year			Population as of December 31	Total annual growth, %
		total increase	natural growth	migration growth		
1990	147,665.10	608.6	333.6	275	148,273.70	0.41
1995	148,459.90	-168.3	-822	653.7	148,291.60	-0.11
1996	148,291.60	-263	-776.5	513.5	148,028.60	-0.18
1997	148,028.60	-226.5	-740.6	514.1	147,802.10	-0.15
1998	147,802.10	-262.7	-691.5	428.8	147,539.40	-0.18
1999	147,539.40	-649.3	-918.8	269.5	146,890.10	-0.44
2000	146,890.10	-586.5	-949.1	362.6	146,303.60	-0.4
2001	146,303.60	-654.3	-932.8	278.5	145,649.30	-0.45
2002	145,649.30	-685.7	-916.5	230.8	144,963.60	-0.47
2003	144,963.60	-630	-888.5	258.5	144,333.60	-0.43
2004	144,333.60	-532.6	-793	260.4	143,801.00	-0.37
2005	143,801.00	-564.4	-846.5	282.1	143,236.60	-0.39
2006	143,236.60	-373.9	-687.1	313.2	142,862.70	-0.26
2007	142,862.70	-115.2	-470.3	355.1	142,747.50	-0.08
2008	142,747.50	-10.3	-362	351.7	142,737.20	0.01
2009	142,737.20	96.3	-248.9	345.2	142,833.50	0.07
2010	142,833.50	31.9	-239.6	271.5	142,865.40	0.02
2011	142,865.40	305.5	-129.1	434.6	143,171.00	0.21
2012	143,171.00	414.9	-4.3	419.2	143,585.90	0.29
2013	143,585.90	439.4	24	415.4	144,025.30	0.31
2014	144,025.30	…	…	…	146,744.00	1.89
2015	146,744.00	438.3	32	406.3	147,182.30	0.3
2016	147,182.30	397.7	-2.3	400	147,580.00	0.27
2017	147,580.00	217.1	-135.8	352.9	147,797.10	0.15
2018	147,797.10	43.6	-224.6	268.2	147,840.70	0.03
2019	147,840.70	118.6	-317.2	435.8	147,959.30	0.08

Years	Population as of January 1	Changes over the year			Population as of December 31	Total annual growth, %
		total increase	natural growth	migration growth		
2020	147,959.30	-503.6	-702.1	198.5	147,455.70	-0.34
2021	147,455.70	-475.6	-1,043.30	567.7	146,980.10	-0.32
2022	146,980.10	-532.7	-594.6	61.9	146,447.40	-0.36

Source: Demographic Almanac of Russia, 2023

According to the analysis, negative natural growth is partially compensated by positive migration growth. Many countries including Russia use the labour resources inflow as a tool for quickly and effectively avoiding of their own resources deficit. However, it related to many negative consequences.

Currently, the majority of labour immigrants in Russia are from Tajikistan, Ukraine, Armenia, Kazakhstan, Kyrgyzstan, and Uzbekistan (Table 8).

Table 8 – Migration of the population of the Russian Federation from the CIS countries, 2022, persons

	Migrants from the CIS countries	the Russian Federation
By countries	Total	661,986
	Azerbaijan	31,773
	Armenia	59,533
	Belarus	18,824
	Kazakhstan	64,382
	Kyrgyzstan	62,360
	Republic of Moldova	23,540
	Tadjikistan	186,560
	Turkmenistan	12,133
	Uzbekistan	54,035
	Ukraine	148,846

Source: Rosstat. The number of migrants, the Russian Federation, 2022[2]

The most of migrants arriving in the Russian Federation are untrained or low-skilled workers. Table 9 shows the migrants by the level of education.

Table 9 – Distribution of migrants aged 14 years and older by level of education and countries of exit/ admission in the Russian Federation in 2022, persons

Group of migrants			International migration
The number of migrants to Russia aged 14 years and older:			652,847
including having an education:	higher professional education (higher education)		65,188
	having an academic degree	Doctors of Sciences	171
		Candidate of Sciences	512
	incomplete higher professional education (incomplete higher education)		42,564
	secondary vocational (secondary specialized)		131,493
	initial professional education		22,651
	secondary general education		224,481
	basic general (secondary general incomplete)		46,950

[2] *Federal State Statistics Service (Rosstat). The number of migrants, the Russian Federation, 2022 (Statistical Bulletin). URL: https:// rosstat.gov.ru/storage / media-bank/Bul-migr_2022.xlsx. (Accessed 27.02.2024)*

Group of migrants		International migration
	primary general (primary) and non-educated	11,325
	no information on the level of education	108,195

Source: Rosstat. The number of migrants, the Russian Federation, 2022[3]

Hence, it decreases the scientific, technical, and the industrial potential of the State, and suggests the necessity of reforming the methods of state regulation in the migration sphere.

In addition, this trend increases the social costs. Moreover, decrease of natural change, the emigration of the Russian population and immigration of foreign ones decline the share of Russian citizens in the Russian Federation. It could threaten national identity, resulting in territorial and legislative difficulties, a decline in defence capabilities and divisions based on different values, views and development goals. This situation will negatively affect the community solidarity and reduce the industrial potential of the State.

Historically, the peoples living on the territory of these states, before their declaration of independence after the collapse of the USSR in 1991, were culturally connected with Russia, and were also native speakers of Russian (as a second language). However, the younger generation do not speak Russian; and cultural differences are also growing.

Moreover, these ethnic groups do not have historically established and legally fixed lands on the territory of the Russian Federation. Therefore, these migrants should be integrated into the Russian community. Over time, some of them will be naturally assimilated as a result of mixed marriages. Otherwise, an increase in the concentration of such migrants could hypothetically threaten the growth of fellow countrymen's association up to the formation of ethnic enclaves. The language barrier and adaptation difficulties promote the isolation of migrants; their communities preserve national traditions, and their qualitative integration does not take place. In could cause the new demographic challenges.

For instance, there is an experience of France. Due to the Schengen Agreement, the possibilities of controlling immigrants in the single European space have become significantly weakened. Additionally, the majority of immigrants, mainly from African and Asian countries, have not been able to integrate into the host society [5, p. 95]. The refusal to integrate causes the formation of ghettos, the emergence of deprived areas with the higher rate of crime and unemployment. Thereby, inconsiderate migration policy resulted in significant negative consequences.

4. Possible solutions to the challenges on Russians labour resources in order to preserve the country's labour potential

Indeed, the replacement of labour potential in terms of negative demographic situation and SMO is a serious social and national threat to Russia. In this regard, it would be reasonable to take an organized and limited approach to attracting labour migrants to the country; for instance, on a temporary (contractual) rather than on a permanent basis, without the possibility for migrants to permanently reside in Russia or create ethnically homogeneous families. It would make it possible to regulate the inflow and outflow of labour in the labor market, depending on changing needs, without creating delayed risks for Russian society. Moreover, it could provide strengthening of cultural and economic relations with the labour migrants' donor countries. These challenges and ways to overcome them should be carefully studied by specialists; the results should be considered when developing new measures in the migration sphere.

Another method of quickly and effectively addressing the issue of labour resources may be the repatriation[4] and resettlement of compatriots.

It could allow the State to avoid the additional regulation in sphere of immigrants' cultural differences, language barrier, etc. Moreover, skilled employees having the work experience in other developed countries

[3] *Federal State Statistics Service (Rosstat). The number of migrants, the Russian Federation, 2022 (Statistical Bulletin). URL: https://rosstat.gov.ru/storage / media-bank/Bul-migr_2022.xlsx. (Accessed 27.02.2024).*

[4] *This paper considers repatriation as a process of voluntary, organized return of Russian compatriots to Russia (those, who forced to leave Russia on the reasons of the Civil and Great Patriotic Wars, the collapse of the USSR, the restoration of repatriates' citizenship rights, etc.).*

could become a source of specific skills and competencies of interest to our state and a resource for the development of domestic science and industry.

In terms of repatriation, we can consider the experience of Israel as an example of an effective migration policy. Israel has existed since 1948. By that time, the country's population was about 1.5 million people. However, by 1960 it had grown to 2.1 million. Sharp population increase occurred partly due to the political conflicts in other countries. It provided the immigration of the Jewish.

However, the key factor in effective repatriation was the provision of attractive conditions and prospects for ethnic representatives. First of all, the Law on Return guarantees every Jewish person the right to repatriation to Israel. The Citizenship Act ensures citizenship to all who have arrived in the country under the Law of Return. The Government of Israel provides various benefits: education, accommodation, finance, etc. The state provides payments to the absorption basket for six months, free admission to language courses (ulpan). During the first three years, there is an opportunity to study at the university free of charge. There are also various programs available before repatriation to the country: they include training and tourist trips. Many repatriates firstly participate in the programmes, and only then decide whether to migrate or not. Starting from the moment of arrival, the further integration process of the repatriate is coordinated by a special consultant, which is of great importance for the integration of repatriates both in the Israeli State system and in local society.

Indeed, the experience in attracting competent specialists could be useful for Russia. However, it is necessary not only to attract external labour resources but also reform the methodology for regulating their quality.

One of the measures implemented could be the formation of an automated data bank containing all the necessary information on emigrated specialists: gender, age, education, working experience, information on the recipient state, position held by the emigrant in the company of this state, etc. Meanwhile, bank system could help to obtain the statistics on valuable emigrating specialists in the context of a massive staff drain and staff training general decrease. The information data could be used by domestic companies experiencing a shortage of highly qualified personnel to attract compatriots [6, p. 82].

Additionally, Russia could stimulate educational immigration. To provide it, the State should develop programs attracting foreign students, and ensure them further prospects for realizing scientific potential in the Russian Federation. It could include preferential professional training necessary for the development of Russia's industrial potential, grants, internships in large companies, scholarships, etc. We believe, it allows the State to balance the quality of migration growth. However, when implementing such a policy, it is necessary to focus on retaining specialists in the country after their training and realising their potential. It could be possible with the involvement of industrial companies in the process of teaching students, their internships in these companies, and the development of online vocational education .

The other important aspect in addressing the issue of replenishing Russia with qualified labour resources is the state ability to «return» students who left for training in other countries [7, p. 396]. In conditions of scientific capacity shortage, the State also requires a revision of social support policies for potential immigrants. The recommendation includes strengthening of financial assistance, providing a favourable socio-economic situation, encouraging students studied abroad to return to their homeland. All above are important factors in attracting migrants.

Another source of increasing the labour force and labour potential of Russia is the repatriation of citizens who have Russian roots and relatives and wish to unite with their ethnic homeland. Moreover, the procedures for obtaining the necessary work-related documents, obtaining and restoring citizenship should be simplified for the repatriates. Also, there should be provided an assistance in creating all the necessary conditions for their successful adaptation and further productive activity.

Non-Russian immigrants expressing intentions to assimilate in Russia and create mixed inter-ethnic families should be provided with assistance in overcoming cultural and language barriers, creating conditions for a comfortable living, and demonstrating of their own labour potential. Simultaneously, the State should regulate the labour market as follows: low-skilled labour force should become a qualitative source of labour

resources not a cause of growing unemployment.

Conclusion

Therefore, to enforce demographic challenges in the current economic and political situation we require fundamentally new concepts. The change of negative demographic trends to positive ones is possible only in case of reforms corresponding to the trends of modern society development.

A liberal approach to migration poses long-term threats to the State. Unregulated migration processes will inevitably cause an increase in unemployment, a decrease in the share Russian nation itself, loss of national identity, social tension, and cultural, ethnic, and religious conflicts. It requires a thorough systematised approach and effective monitoring of demographic trends. The state should find a balance between attracting labour from outside and increasing its own labour resources. It also should provide the rational use of existing labour resources.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Yuriy V. Bekrenev – conceptualization, project administration, writing – original draft.
Alexandra S. Vakina – data curation

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ESG-transformation of Russian regions: theoretical aspects

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ORIGINAL ARTICLE

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Abstract. The paper considers the theoretical aspects of sustainable development and ESG transformation of Russian regions. The research substantiates a systematic approach to the balanced development of regions as socio-ecological and economic systems. The concept of sustainable development and regional ESG transformation correlates to the concept of regional economic security, economic growth, human and social capital development. In our opinion, a systematic reproductive approach is the most productive in solving many problems of regional socio-economic development. Moreover, it could consider the following issues of regional ESG transformation: a six-stage scheme of social reproduction: «science – production – distribution – exchange – consumption – utilization»; natural-economic-institutional-social reproduction chain. One of the aspects of the reproductive approach is the concept of sustainable development and the ESG agenda. However, in terms of economic theory and philosophy, four types of «transformational connections» can be distinguished: interaction, relationships, institutions, and management decisions. The regional sustainable development, the achievement of high indicators of its socio-economic development is presented as a balanced interaction of three components: economy, social sphere, and ecology. Russian scientists consider regional ESG transformation in terms of economic security, regional economic growth, and increasing its attractiveness, development of technological potential, improvement of the institutional environment, and competencies of managers at all levels in the field of sustainable development and ESG.

Keywords: theories of regional development; region as a socio-ecological and economic system; sustainable development; regional ESG transformation

JEL codes: O14, O18, R11, R58

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Introduction

In conditions of instability (COVID-19 pandemic, its overcoming, economic sanctions, etc.), it is important to reduce regional socio-economic inequality, ensure their stable and sustainable development, strengthen their potentials, including those associated with less dependence on imports, and self-sufficiency. The main risks of regional development include increasing environmental risks, exhaustion the resource potential of existing industries within the economic space, continued degradation of social infrastructure and settlement system. According to M. Zamyatina and S. Tishkov, the increase in the pace of exploration and development of new mineral deposits is accompanied by an increase in the environmental burden, a lack of domestic companies owns technological reserve, financial resources, market instability, and increasing geopolitical opposition. All above cause the environmental agenda has become the strongest factor of influence and requires solving the problem of accumulated environmental damage to regions and degradation of the natural environment. The policy of the European Union, strengthened by the 2015 Paris Agreement on reducing the «carbon footprint» in the economy, has activated large Russian companies working for exports to implement the Sustainable Development Agenda (SDA) and ESG.

However, maintaining the development of regions and companies require large-scale investments in industrial and infrastructure projects, attracting and consolidating human capital, especially peripheral ones, diversifying regional economies, etc. [13]. Many scientists concern on the human capital regional development, increasing its investment, innovation activity and attractiveness, strengthen state support measures for the regions, especially peripheral ones, etc.

In Russia, the implementation of sustainable development concept and ESG is becoming more popular (E – «environmental», environmental factors; S – «social», social factors and G – «governance», corporate governance factors). There was established a system of institutions supporting the Sustainable Development Agenda (SDA) and ESG at the federal level (legislative and executive authorities of the Russian Federation, the Bank of Russia, Bank for Development and Foreign Economic Affairs, Moscow and St. Petersburg Stock Exchanges, National ESG Alliance, Skolkovo School of Management, etc.) [6].

However, the main issues for following the ESG agenda for regions are: values and interests of their own development, political interests, international economic cooperation, changing consumption patterns, etc. [30, pp. 7-8].

In the future, it is necessary to actively implement ESG principles into public administration standards at the regional level.

Research shows as follows:

– almost all regions are involved in ESG transformation and implement the principles of sustainable development in the strategic planning process;

– about 80% of regions and cities interact with businesses in terms of ESG factors;

– the number of Russian cities included sustainable development in strategic planning documents in 2011 was 32, currently there are more than 700 [23].

According to HSE experts, by the end of the 2010s, the SDA and ESG had been established into an ecosystem including at least four levels:

1) the conceptual level is formed by new theories of capitalism: neo-communitarianism and the theory of stakeholder capitalism, etc.;

2) the regulatory level is represented by international documents (the UN Sustainable Development Goals, the 2015 Paris Climate Agreement, etc.); it also includes supranational and national documents (i.e., the Directive on Corporate Reporting in the field of Sustainable Development of the European Union, the Requirements of the US Securities Commission). Currently, the regulatory framework for regional ESG transformation is being formed in Russia at the federal level – the following legislative acts have been approved: Decree of the President of the Russian Federation No. 440 on 04.01.1996 «On the Concept of Transition of the Russian Federation to Sustainable Development», Decree of the President of the Russian Federation No. 642 on December 1, 2016 «On the Strategy of Scientific and Technological Development of the Russian Federation Decree of the Government of the Russian Federation on 14.07.2021 No. 1912-r «On Approval of the Goals and Main Directions of Sustainable (Green) Development of the Russian Federation», Decree of the President of the Russian Federation on October 26, 2023 No. 812 «On Approval of the Climate Doctrine of the Russian Federation», etc. There has been approved the Strategy of socio-economic development of the Russian Federation with low greenhouse gas emissions until 2050. Moreover, there was established the goal of achieving carbon neutrality by 2060. Since 2021, the Bank of Russia issued 13 Information Letters and Recommendations on Sustainable Development (as of 20.04.2024);

3) the assessment and monitoring level consists of two main components: international standards (the most famous are GRI, SASB, CDP, CDSB, TCFD and IIRC) and ratings (there are already more than 600);

4) the project level includes ESG initiatives of specific countries, companies, and regions [30].

In this article, we will consider the theoretical aspects and main conceptual approaches of SDA and regional ESG transformation.

Main part

The study of sustainable development and regional ESG transformation is based on the use of general

scientific methods of analysis and synthesis, induction and deduction. Also we use the special research methods: the method of content analysis of economic publications, the method of economic comparative studies, the monographic method (comparative analysis of methodological and theoretical positions in scientific literature).

In our opinion, a systematic reproductive approach is the most productive in solving many problems of regional socio-economic development. For instance, At Ivanovo State University, Professor B.D. Babaev and his students conducted a comprehensive analysis of the reproductive process. This analysis includes various reproductive chains, for example, the triad: «productive forces – the economic basis (complex, multilevel, diverse, and contradictory economic relations of economic activity) – superstructure (social, cultural, political, legal, and similar relations)»; chain within the framework of synthesis political economy and institutional economics «economic activity – economic relations – institutions – demand – use of goods» [2; 3]. Regional ESG transformation correlates with a following reproductive chain (a six-stage scheme of social reproduction): «science – production – distribution – exchange – consumption – utilisation» [24]. It emphasises the requirement for comprehensive recycling. Indeed, in our country the issue of recycling and treating waters are also relevant ones.

The natural-economic-institutional-social reproduction chain is quite interesting one. However, within the framework of the «natural processes» bloc, it assumes the study of «natural productive forces» – the substance and forces of nature providing a positive effect for people; the need for widespread use of nature-saving technologies and the transition to a nature-saving type of reproduction. Within the framework of the «transformation of natural processes into economic ones», the focus is on a person as a performer, organizer, controller providing a targeted orientation to natural processes (natural processes themselves are spontaneous and uncontrollable). The result is the formation of anthropogenic productive forces created by man himself. Moreover, the man occupies a central place in this model. On the basis of nature and economics synthesis, there is a continuous formation of new types of human activity. It is a result of deeper human penetration into the world of things (nanotechnologies, biotechnology, space exploration, oceans, etc.). A person is forced to join the socialised world; the problem of his interactions with other actors acquires a fundamental character, and comes out on the topic of harmonising the interests of participants, coordinating individual and public interests. In this case, coordination of activities, motivation of people, and a common national idea acquires outstanding importance. The system of institutions forms an institutional environment adequate to the requirements of economic laws. Therefore, the key point is the degree of institutional compliance with the tasks of socio-economic development, predetermined by economic laws, and requirements of nature itself (laws of nature). The social sphere acts as the final stage of the reproductive chain of «natural-economic-institutional-social processes». In this regard, the emphasis shifts towards the concept of «moral economy» (the framework of social processes) and «moral personality» concerning a person with developed moral traits (qualities), environmental education, and behaviour.

In terms of the above reproductive analytical chains, the aspect of the reproductive approach is the concept of sustainable development and the ESG agenda.

Sustainable development is interpreted in different ways. Some researchers consider this concept in terms of the changing nature of civilization economic growth. Others consider the essence of sustainable development from the point of view of preserving biospheric equilibrium. The third analyse sustainable development from the perspective of modernisation of relations between developed and developing countries. The fourth focus on the global nature of the socio-ecological processes management [12; 25]. However, A.D. Ursul and V.A. Los understand the similarity of the numerous interpretations of sustainable development strategic goal. It requires to «combine the dynamic socio-economic development of civilization with maintaining the balance of historically established natural ecosystems, the traditional natural resource potential of the biosphere as an unconditional factor of survival and development of both man and civilization in general» [27, p. 123].

Nowadays the concept of «sustainable development» is used at the mega-, macro-, meso-, and micro-levels [6]. E. Letyagina and V. Perova refer it to «creative tools for managing economic development» [21, p. 93].

However, V. Gilmundinov, Yu. Pankova, and T. Tagaeva highlight the urgency of significantly strengthen state role in the implementation of the SDA and «green economy» in terms of the global challenges [10].

E. Vostrikova and A. Meshkova associate regional ESG-transformation with economic security [9]. T. Spitsyna – with the provision of sustainable regional development with regional economic growth [26]; V. Kulibanova and E. Litvinova – with the increase of its attractiveness [19].

Balanced regional development has been the issue of research by both domestic and foreign scientists for many decades. Considering international and domestic experience, 3 main models of regional policy can be distinguished: the policy of poles (centers) of regional growth, the policy of alignment, and the spatial model of regional development. The implementation of this policy contributes to the reduction of socio-economic inequality of the regions, their attempts to achieve sustainable development goals (17 of them).

For many years, the approach to regions as socio-ecological and economic systems functioning in dynamically changing conditions of the internal and external environment has been widespread in scientific publications. Nowadays, the approach is accompanied by regional ESG transformation. However, in terms of economic theory and philosophy, four types of «transformational connections» can be distinguished: interaction, relationships, institutions, and management decisions. The interaction plays a crucial role in understanding the functioning of the regional and national economy. Relationships are, primarily, relations of ownership and relations of management. Institutions, according to D. North, are formal and informal norms and rules that business entities must adhere to; they are mechanisms to ensure the implementation of these norms and rules through the use of incentives and sanctions measures against producers and consumers. Indeed, management decisions are made by people based on the information they have and, taking into account the tasks, specific decisions to be implemented. There is a certain procedure for making a decision, registration, communication to performers, control, etc.

For instance, V. Kulibanov, T. Teor, I. Ilyin, and L. Sharakhin emphasize regional sustainable development and the achievement of high indicators of its socio-economic development in terms of balanced interaction of 3 components: economy, social sphere, and ecology. According to the authors, this particular approach will contribute to strengthening the technological sovereignty and security of Russia as a whole [20]. Moreover, the authors consider the issues of ESG transformation as a factor in increasing the regional brand and accumulating social capital to a diffuse group of regional stakeholders [15].

O. Kiselyova considers the balance of the region with regional stability or «regional resistance». It implies regional resilience, its ability to withstand and adequately respond to various challenges and shocks [17, p.72].

N. Barseghyan, S. Kudryavtseva, and V. Sopin consider regional sustainable development and ESG transformation within the framework of economic systems theory and cluster the Russian Federation regions according to the integral components of ESG policy. They identified «contradictory» clusters for the implementation of ESG policy. On the one hand, there is a high level of management (G-component), the environmental friendliness of the regional management system combined (E-component) with high social tension (S-component). It refers to Bryansk, Smolensk, Novgorod, Perm, and Trans-Baikal regions, etc. [5, p.132].

A modelling method is used in the study of regional ESG transformation. S. Borodin implements a model and methodology for analysing the regional economy based on ESG principles with the calculation of the sustainable development index based on statistical indicators included in the ESG standard [8]. S. Izmalkova and A. Sabinina propose ESG model in the form of a digital platform [14].

E. Letyagina and V. Perova provide the analysis of regional sustainable development using cluster data analysis based on neural network modelling and information technologies. This study showed an uneven distribution of regions in clusters, a difference in the levels of average indicators across clusters, etc. It indicates the uneven regional development in the Russian Federation in terms of ecology and investment [21, pp. 97-100].

The research made by K. Kalitseva presents a transformational model of the management system for sustainable regional development. In this case the subsystems of regional development (economic and social

ones) are interconnected with the ecological subsystem updating within the framework of ESG transformation. Moreover, institutional superstructure is under development. Additionally, the technology of managing regional SDA within the framework of the proposed model is a complex of techniques and ways to ensure regional sustainable balanced development through the interaction of three organizational subsystems. They are as follows:

– the management subsystem. It related to the activities of the regional government authorities;

– the target assessment subsystem. It is a system for assessing regional functioning through the analysis of target indicators of economic, environmental, and social subsystems development;

– the supporting subsystem. It consists of legislative conditions, resource capabilities, institutional, and infrastructural support for regional development.

This approach, according to the authors, should be based on technologies of rolling budgeting, indicative planning, development of sustainable balanced strategy based on a system of target indicators [16, pp. 86-87].

Considering SDA and ESG, O. Kiselyova suggests an ecosystem approach based on establishing interaction between participants in regional ecosystem. It should involve authorities, officials, government, business and the social sphere representatives [17].

The analysis and regional development of SDA and ESG are accompanied by an analysis of agenda implementation by large companies in the regions. Additionally, partnership with local authorities and communities is considered an important factor of companies' activities to achieve regional development. Analysing the region's positions in ESG ratings, scientists compare the rating results with the presence of companies in the region that are included in ESG ratings and pursue a policy of responsible investment. For example, M. Shamsutdinova analysing the sustainable development of the Republic of Tatarstan considers the following ESG-rated companies: SIBUR, Tatneft, Lukoil [28].

M. Zamyatina and S. Tishkov – Severstal, SIBUR Holding, and Segezha Group. For instance, in 2020 Severstal concluded cooperation agreements in 8 regions of its presence; SIBUR Holding (represented in 22 regions) concluded agreements on socio-economic cooperation with the leadership of the Amur region, Yamalo-Nenets and Khanty-Mansi Autonomous okrugs, the Tyumen region. Segezha Group operates in the Republic of Karelia, the Krasnoyarsk Krai, Arkhangelsk, Vologda, Irkutsk, Kirov, Kostroma, Moscow, and Rostov regions. Indeed, as a primary scientific goal the authors note «conceptual, methodological, and analytical support for the transformation of ESG management from a challenge to an opportunity and a starting point for an overdue change in the model of innovative development of companies and regions» [13, pp. 504, 508].

Many authors conclude regional ESG depend on the composition and industry affiliation of regional enterprises, the speed of their transition to technologies in terms of ESG principles [22].

The concept of SDA and ESG approach in regional management is associated with the effectiveness of environmental and social risk management. It is important for society and potential investors [28], and implies a transition from the formation of regional socio-economic potential to assessment the possibilities of realizing its promising socio-economic potential [16].

An important role is assigned to increasing the competences of regional management and generally improving the efficiency of public administration in order to coordinate the efforts of multiple stakeholders in the process of implementing the concept of SDA and ESG. For example, A. Babkin and N. Egorov recognise the strategic management of sustainable ESG development of economic entities is currently one of the most important factors in terms of regional digital economy transformation [4].

The scientists assess the integration of the SDA and ESG into the reformation of the Russian economy. Many authors note challenges of regional ESG transformation and companies in Russia. For instance, T. Spitsyna emphasises an emerging stage in the implementation of the ESG agenda. Indeed, the process of ESG principles integration has more punctual than comprehensive nature [26].

Indeed, V. Gordeev and A. Belov highlight the challenges of insufficient financial support for the regions, the discrepancy of financial resources to the scope of authority. Therefore, it prevents the realisation of the sustainable development agenda. The authors recommend the development of high-tech industries, formation

of a regional economic council, constantly search for new sources of the regional budget replenishment, etc. [11]

For instance, S. Shkiotov, analysing the spillover effects, shows not only their positive effects (labour productivity growth, the influx of foreign direct investment and knowledge into the economy, infrastructure development and an increase in GDP), but also their negative impact on the economy (increased volatility in markets, the risk of job losses, increased problems of income inequality in society and etc.) [29].

In turn, T. Altufyeva notes the negative relationship between the levels of ESG and regions economic development (on the example of the Republics of Tatarstan and Bashkortostan) and puts forward proposals to improve the indicators for assessing regional ESG transformation for block G [1, p. 127].

The researcher O. Korobova dwells on the issues of developing ESG competencies among managers. According to the example of the Skolkovo School of Management in the field of sustainable development and the ESG agenda, we can distinguish the following competencies: ESG transformation, ecology and climate, circular economy, sustainable operational activities; sustainable development of territories; sustainable finance [18].

Our analysis of the research trends of regional ESG transformation concerns with the precise analysis of the ESG agenda environmental regional components. The development of regional ESG transformation is considered in conjunction with innovative development, the «green» economy, and the digital transformation. Business and universities play an important role in promoting the ESG agenda in the regions. Regional ESG transformation is associated with the ESG transformation of the public administration system (Table 1).

Table 1 – Development of certain aspects of regional ESG transformation in the papers of Russian scientists

Researchers names	Research topics
Vostrikova E.O., Meshkova A.P., Letyagina E.N., Perova V.I., Berendeeva A.B., Nikolaeva E.E., etc.	Theoretical aspects of regional ESG-transformation
Gilmundinov V.M., Pankova Yu.V., Tagaeva T.O., Sytnik N.A., etc.	Regional differentiation of regional ESG-transformation
Bedenko S.N., Wegner M.A., Nikonorov S.M., Pshenichnikova P.V., Zinoviev I.S., Azarova N.A., Nebesnaya A.Yu., Tsentkovskaya A.A., Polyakova E.A., Prokshits E.E., Mingaleva J.A., Nikitina I.A., Kruglova I.A., Chuksin I.V., etc.	Ecological subsystem of regional ESG transformation (E-component)
Akhmadeev A.M., Malitskaya A.O., Zamyatina M.F., Tishkov S.V., etc.	«Green» technologies and innovations as a driver of regional ESG transformation
Popodko G.I., Nagaeva O.S., Shishatsky N.G., etc.	The social component of regional ESG transformation (S-component)
Babkin A.V., Egorov N.E. Balaboiko A.V., Spitsyna T.A., Volkov A.R., Golubeva A.S., etc.	ESG-transformations of the public administration system (G-component)
Bushueva M.A., Izmalkova S.A., Sabinina A.L., Verenikina A.Yu., Ochilova M.A., Finley D.T., etc.	Synergy of digital regional ESG transformation
Kalitseva K.A., Narolina T.S., Smotrova T.I., Purgaeva I.A., Nekrasova T.A., Trachenko M.B., etc.	Monitoring and evaluation of regional ESG transformation
Abdullina L.G., Valeeva R.R., Sushkova A.R., Vasiliev V.L., Grenaderova M.V., Perekrest N.V., Zatepyakin O.A., Rasskazova A.A., Pravdina O.A., Solovyova O.A., Shamsutdinova M.R., Shishkina E.A., etc.	Regional ESG-ratings

Researchers names	Research topics
Barseghyan N.V., Kudryavtseva S.S., Sopin V.F., etc.	Clustering of the Russian Federation regions according to the integral components of ESG policy
Boldyreva T.V., Belyaeva O.V., Ershov Yu.O., Fedotova O.V., Tabekina O.A., Dudina V.Yu., Yurchenko T.V., etc.	Financing of regional ESG transformation, investments in regional ESG transformation
Zamyatina M.F., Tishkov S.V., Kulibanova V.V., Teor T.R., Ilyina I.A., Sharakhina L.V., Parushina N.V., Morozova N.S., Morozov M.M., etc.	The role of regional business in the ESG transformation agenda
Arkhipova N.V., Volkova T.V., Kuzmina E.V., Potashova V.A., Startseva O.P., Nuzhina I.P., Kaverzina L.A., Egorova O.V., etc.	Regional ESG-transformation: industrial aspects
Golubeva A.S., Volkov A.R., Chuzhmarov A.I., Chuzhmarova S.I., etc.	ESG-transformation of the Northern territories and Arctic regions
Abramyan G.A., Yeletsky A.N., etc.	The role of universities in regional ESG transformation
Babkin A.V., Egorov N.E., etc.	Rating assessment of the leaders of regional ESG transformation within the framework of strategic management

Source: composed by the authors based on e-library publications, 2022-2024

The authors propose the adaptation of international ESG-principles and metrics for assessing «green» development to the current conditions of Russia and its regions. Also they propose the completion of the national infrastructure of sustainable development and ESG assessment metrics in order to improve the effectiveness of state support for «green» development of Russian regions [1, p.127].

Conclusions

In our opinion, a systematic reproductive approach is the most productive in solving many problems of regional socio-economic development. Moreover, it could consider the following issues of regional ESG transformation: a six-stage scheme of social reproduction: «science – production – distribution – exchange – consumption – utilization»; natural-economic-institutional-social reproduction chain.

One of the aspects of the reproductive approach is the concept of sustainable development and the ESG agenda. However, in terms of economic theory and philosophy, four types of «transformational connections» can be distinguished: interaction, relationships, institutions, and management decisions. The regional sustainable development, the achievement of high indicators of its socio-economic development is presented as a balanced interaction of three components: economy, social sphere, and ecology. Russian scientists consider regional ESG transformation in terms of economic security, regional economic growth, and increasing its attractiveness, development of technological potential, improvement of the institutional environment, and competencies of managers at all levels in the field of sustainable development and ESG.

In the study of regional ESG transformation, the method of modelling and clustering of regions of the Russian Federation according to the integral components of ESG policy is widely used.

Currently, the practice of implementing SDA and ESG modernization policies in the regions is punctual one. The main reasons are as follows: the insufficient provision of the regions with the necessary financial resources, the unavailability of sufficient experience, knowledge, and competencies to implement the policy, insufficient motivation for regional ESG transformation. At the regional level, it is necessary to achieve a balanced development of all three components of ESG – E, S, and G.

Business and universities play an important role in promoting the ESG agenda in the regions. Regional ESG transformation concerns with the ESG transformation of the public administration system. It should provide the development of ESG competencies among the leaders of regional ESG transformation and a

rating assessment of their activities within the framework of strategic management.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Elena E. Nikolaeva – conceptualization, project administration, writing – original draft.
Alla B. Berendeeva – formal analysis; writing – review & editing.

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Statistical analysis of the impact of innovations on labour productivity in the constituent entities of the Central Federal District

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ORIGINAL ARTICLE

Abstract. The relevance of the research topic is due to the contradiction between the innovation activity of organisations and their contribution to regional socio-economic development. Innovation should lead to productivity growth and contribute to the creation of high-productivity jobs. However, the situation in many Russian regions is paradoxical one – despite of high innovation activity of small and medium-sized enterprises their labour productivity remains at the same level or decreases. The purpose of the research is to assess the impact of innovations on labour productivity for the Russian economy on the example of the Central Federal District regions. The paper verifies the hypothesis on the presence of statistically significant relationship between the indicators characterising the innovation activity of small and medium-sized enterprises, the index of labour productivity, and the growth of high-productive jobs in the Central Federal District regions through the methods of economic and mathematical modelling. According to the research results, the parameters of small and medium-sized enterprises innovation activity do not have a significant impact on the dynamics of socio-economic development of the Central Federal District regions.

Keywords: innovation activity; labour productivity; CFD, SMEs; innovation; correlation analysis

JEL codes: R11, O32

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Introduction

From an economic perspective, innovations act as a key factor of regional development. They contribute to the growth of labour productivity, increase GRP, and, finally, ensure the improvement of the population quality of life.

Innovations are becoming even more important in the context of unprecedented sanctions against the Russian economy. Labour productivity growth and the creation of highly productive jobs are long-term drivers of economic growth. These drivers will make it possible to reduce the negative effects of economic sanctions against the Russian economy and solve the problem of labour shortages developed in recent years. However, there is a paradoxical situation in many constituent entities of the Russian Federation: high innovation activity of small and medium-sized enterprises (SMEs) has practically no impact on labour productivity and other macroeconomic indicators of regional development.

The relationship between innovation and labour productivity is revealed in modern economic research:

Kurt S. & Kurt Ü. (2015): Although it is generally accepted that innovation increases the efficiency and productivity of capital, it can also be said that it increases the productivity of labour force as well. Recently the ease and prevalence of performing research through the internet, as well as developments in information and communication technologies had a positive effect on load and productivity of labour force accelerated workflow and also increased the efficiency of production processes and output amounts. Developments of information and communication technologies especially provided development opportunities for countries having high population and labour force and also a high development potential due to an increase in efficiency and productivity of labour force and helped them to have faster and easier economic growth or development. In this study, the aim is to research the effects of innovation on labour productivity for the 5 countries defined as BRICS (Brazil, Russia, India, China, South Africa) which have drawn attention in recent years due to their economic performances by using panel data and dynamic panel data methods. The results of the study produced a positive relationship between innovation and labour productivity [1].

Preenen P.T.Y., Vergeer R., Kraan K. & Dhondt S. (2017): Findings suggest that internal labour flexibility practices benefit both labour productivity and innovation performance of companies. If innovation and labour productivity are considered key to long-term survival, firms and policymakers should consider internal labour flexibility practices [2].

Ismail R. (2018): Human capital theory postulates that investment in human capital will increase labour quality and eventually generates higher productivity in an organisation. In small and medium enterprises (SMEs), the quality of workers is still low due to lack of investment in human capital especially in terms of training; and this is the main cause of low labour productivity, hence, leading to weak firm's performance. This article aims to analyse the impact of human capital and innovation on labour productivity by utilising the data of 4,661 manufacturing firms of 2009 in Malaysia. The result shows that human capital and innovation play significant roles in increasing labour productivity in Malaysian SMEs [3].

Okumu I.M. & Buyinza F. (2018): Our results indicate that the relationship between labour productivity and a firm engaging in any form of innovation is neutral. However, there is evidence of complementarity among product, process, marketing and organisational innovation. Specifically, there is a positive association between labour productivity and innovation when a firm engages in all the four innovation types. Even then, the complementarity effect turns out weakly positive with incidences of negative relationship when using any combination of innovations that are less than the four types of innovations [4].

Kheyfets B.A. & Chernova V.Y. (2019): The article examines the dependence of the growth rates of labor productivity on the growth rates of investments in fixed assets in Russian agriculture. The situation in Russian agriculture shows that in recent years, against the background of significant investments in fixed assets and growth of physical capital, the quality of this capital remained at a low level and could not ensure high and long-term growth in labor productivity. Additionally, an assessment of the intensity of innovation activity was conducted and an analysis of the factors was made, hindering the spread and introduction of breakthrough digital technologies [5].

Bhattacharya P. & Rath B.N. (2020): By employing simple ordinary least squares (OLS) regression technique, we find that innovation affects the labour productivity positively for Chinese as well as Indian manufacturing firms, but its impact on firm productivity is relatively weak in case of India as compared to China. Second, other factors such as average wage of the workers, education of production workers and training do significantly boost the labour productivity of Chinese manufacturing firms as well as for Indian firms. Third, our results based on firm size also indicate that the impact of innovation activities on labour productivity is higher in case of large firms as compared to medium firms. However, innovation does not affect the labour productivity of small manufacturing firms for both China and India [6].

Woltjer G., van Galen M. & Logatcheva K. (2021): The results show that both product and process innovation increase labour productivity and therefore induce direct reductions in employment. However, these negative employment effects are more than compensated by increases in sales, implying that both process and product innovations increase employment. It is argued that the effects for sales and labour productivity are probably underestimated in all research that uses CIS survey data because these do not show the price

effects of increased productivity, but that this effect cancels out in the estimated employment equation [7].

Wadho W. & Chaudhry A. (2022): We find significant heterogeneity in the impact of different innovations on labor productivity: Organizational innovation has the largest effect followed by process innovation. But unlike much of the literature, we found a negative impact of product innovation suggesting a disruption effect of new products. We find a strong impact of engaging in knowledge creation on product and process innovation. We also find that external knowledge networks and innovation cooperation play no significant role in firms' decision to engage in innovation and its intensity, however, vertical linkages with suppliers (clients) promote product (process) innovations. Foreign competition has a negative effect on product innovation and a positive effect on organizational innovation. Exposure to foreign markets both in term of exporting and quality standard certification leads to better innovation performance [8].

García J.F., Armenta A., Martínez L., Rebollo J. & Rentería R. (2023): The existence of a relative but not determinant influence of the innovation in the labor productivity of the Mexican manufacturing industry was found, since the gross formation of fixed capital contributes more to it, and that the decreasing tendency of its levels of labor productivity is a reflection of structural failures and obsolescence in the productive apparatus, so that innovation represents a change in the technological trajectory for Mexican manufacturing activities, providing higher levels of labor productivity and competitiveness [9].

Naveed A. & Wang C. (2023): This paper attempts to explain the impact of innovation on productivity, which is moderated by structural change. Ignoring such a moderation effect may cause over- or underestimation of the true effect. Using a global sample from 1996 to 2013 for a panel of 65-87 countries with treatments for endogeneity (2SLS and system GMM), we find a positive significant effect of innovation on both structural change weighted productivity and unweighted average productivity, and that the effect on structural change weighted productivity is larger. We also find this effect to differ in economies experiencing different structural transition phases and income levels. Our results are robust across alternative measures of structural change, such as diversity measure and natural resource share in GDP [10].

Tetteh C.K. (2024): The results highlight the multifaceted determinants of labour productivity in Ghana's manufacturing sector, emphasizing the positive impact of R&D. R&D also significantly influence both product and process innovation. These findings are useful for the development of human capital in Ghana [11].

The analysis of the sources allows us to conclude:

- studies of the innovations' impact on labour productivity have a well-defined country specificity;
- innovation generally has a positive impact on labour productivity growth both at the organisation and the national economy levels.

The purpose of the research is to assess the impact of innovations on labour productivity for the Russian economy on the example of the Central Federal District regions.

Methods

According to the hypothesis of the study, there is a direct, statistically significant relationship between the level of innovation activity of SMEs and the dynamics of socio-economic development of the CFD regions. Innovation contributes to the growth of labour productivity, and provides a creation of highly productive jobs.

To assess the innovation activity of SMEs in Russia, we use Rosstat data and methodological recommendations for assessing the level of innovation activity at the regional stage: «The level of innovation activity of organisations» (approved by the Federal State Statistics Service (Rosstat) by order No. 818 on 27 December 2019)[1]. The methodology was developed to ensure the formation of official statistical information on the indicator «Level of innovation activity of organisations». The methodology is also used to ensure comparability with the indicator «The share of organisations engaged in technological innovation in the total number of examined organisations». This indicator is developed for the purpose of information support for monitoring the achievement of the national goal «Acceleration of technological development of the Russian Federation, increasing the number of organisations implementing technological innovations to 50 percent of

[1] *Order No. 818 on 27.12.2019 «On approval of the methodology for calculating the indicator «Level of innovation activity of the organisation». Available at: URL: https://rosstat.gov.ru/storage/mediabank/pr818-27122019.pdf (accessed: 01.05.2024) (in Russian).*

their total number», defined by the Decree of the President of the Russian Federation No. 204 on 7 May 2018[2].

Methodological basis of the research:

1. The research period is 13 years (long-term).

2. The indicators under study: the level of innovation activity of organisations (LIAO); the share of organisations implementing technological innovations (SOITI); the volume of innovative goods, works, services (VIGWS); the cost of innovation activity of organisations (CIAO); the share of small enterprises implementing technological innovations in the reporting year in the total number of surveyed small enterprises (SSEITI)[3]; the labour productivity index (LPI); the growth of high-productive jobs (GHPJ).

3. Sample: regions of the Central Federal District, 2010-2023.

4. Research methods: correlation analysis is used to test the proposed hypothesis. In this research, a significance level (p-value) of 5% was used to test the significance of the correlation coefficient.

The dynamics of the studied indicators in the long-term time interval is presented on Figures 1-7.

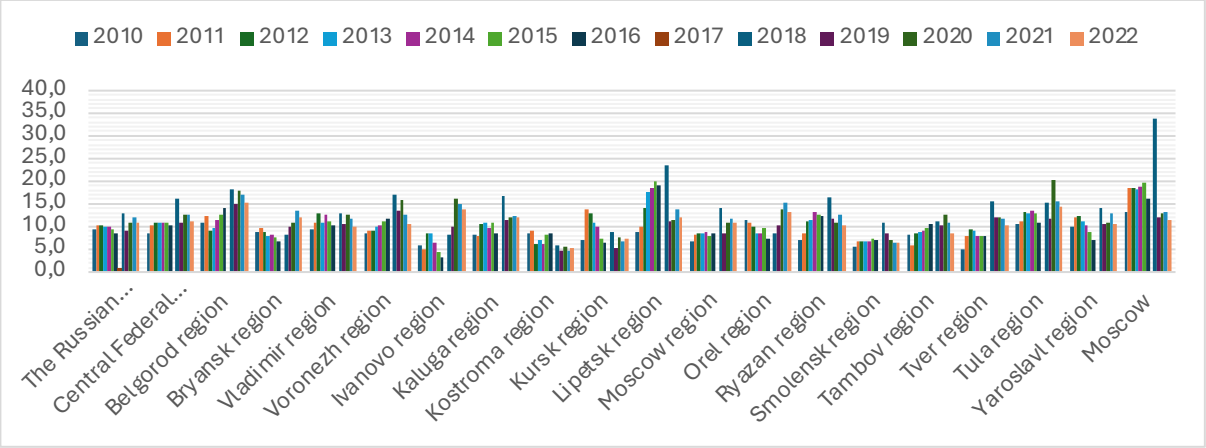

Figure 1. Level of innovation activity of organisations, by constituent entities of the Russian Federation, 2010-2022

Source: composed by the authors according to Rosstat data

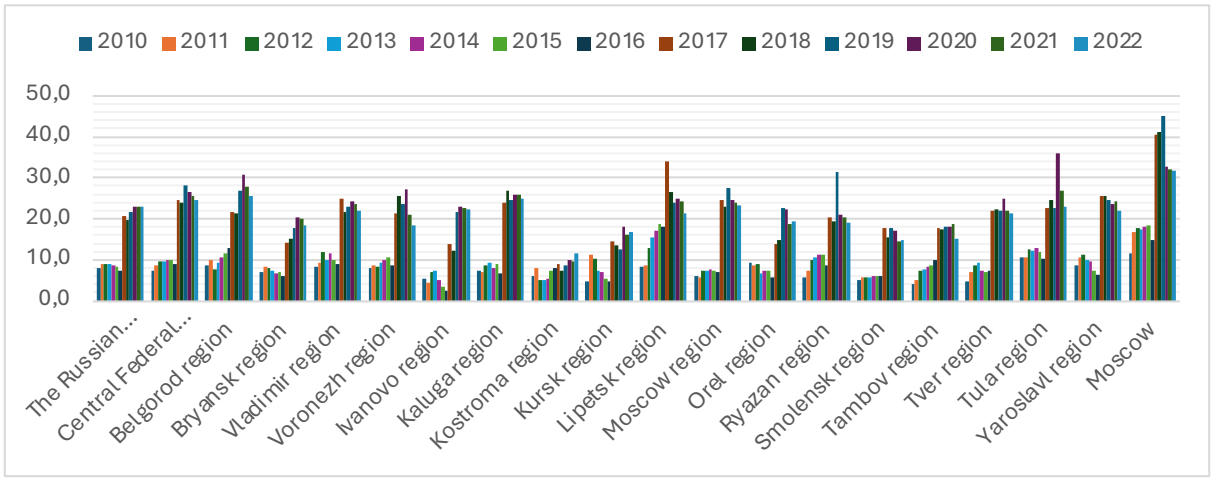

Figure 2. Share of organisations implementing technological innovations in the total number of examined organisations, by constituent entities of the Russian Federation, 2010-2022

Source: composed by the authors according to Rosstat data

[2] *Decree of the President of the Russian Federation on 07.05.2018 No. 204 «On national goals and strategic objectives of the development of the Russian Federation for the period until 2024». Available at: URL: http://publication.pravo.gov.ru/Document/View/0001201805070038 (accessed: 01.05.2024) (in Russian).*

[3] *The data according to Rosstat. Section: Science, Innovation and Technology. Available at: URL: https://rosstat.gov.ru/statistics/science (accessed: 01.05.2024) (in Russian).*

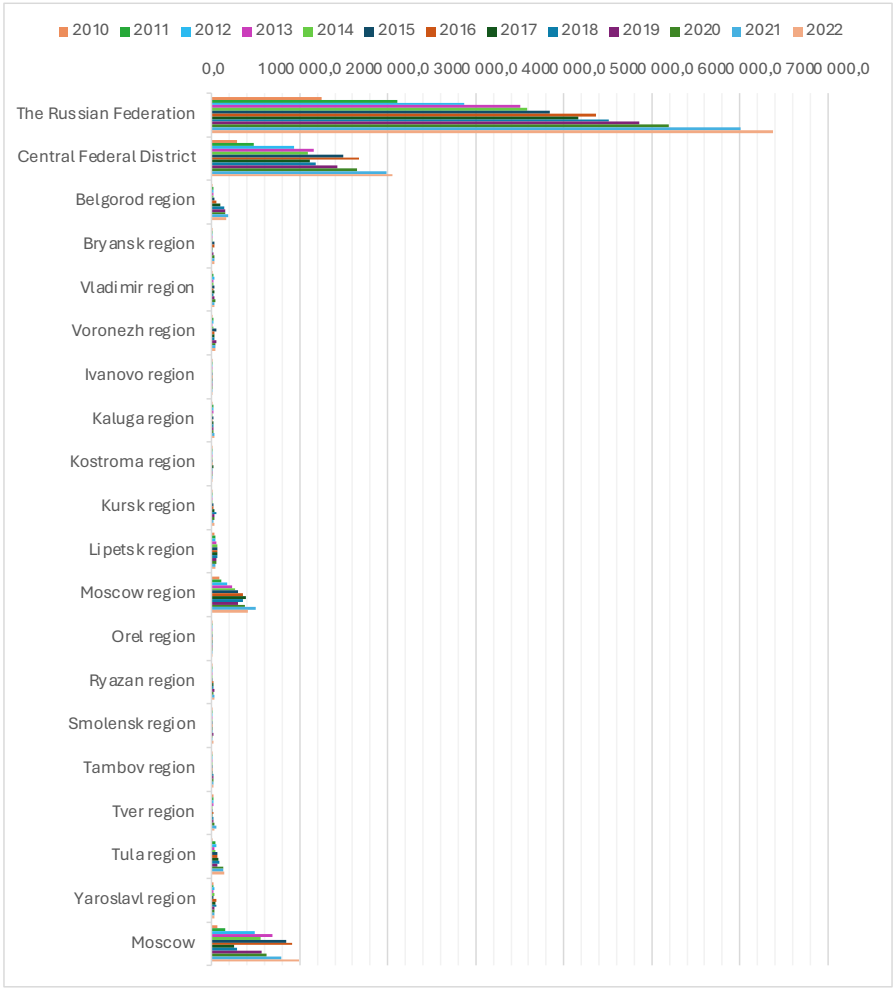

Figure 3. Volume of innovative goods, works, services, by constituent entities of the Russian Federation, 2010-2022

Source: composed by the authors according to Rosstat data

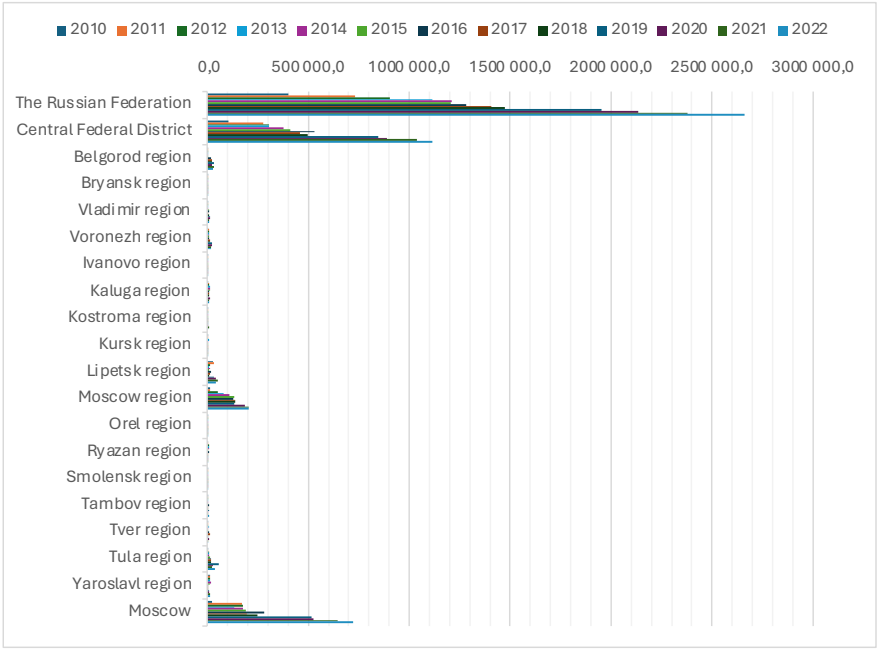

Figure 4. Costs of innovation activities of organisations, by constituent entities of the Russian Federation, 2010-2022

Source: composed by the authors according to Rosstat data

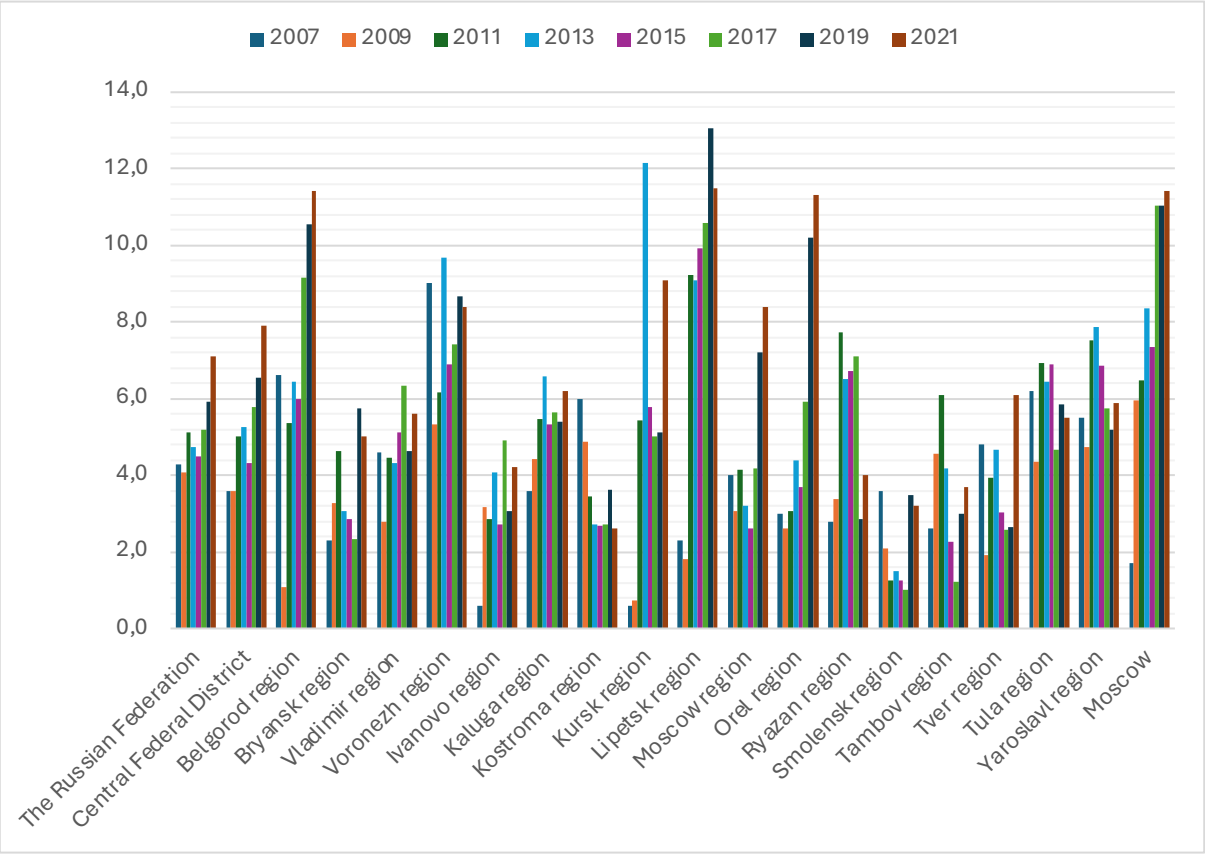

Figure 5. The share of small enterprises implementing technological innovations in the reporting year in the total number of examined small enterprises, by constituent entities of the Russian Federation, 2007-2021
Source: composed by the authors according to Rosstat data

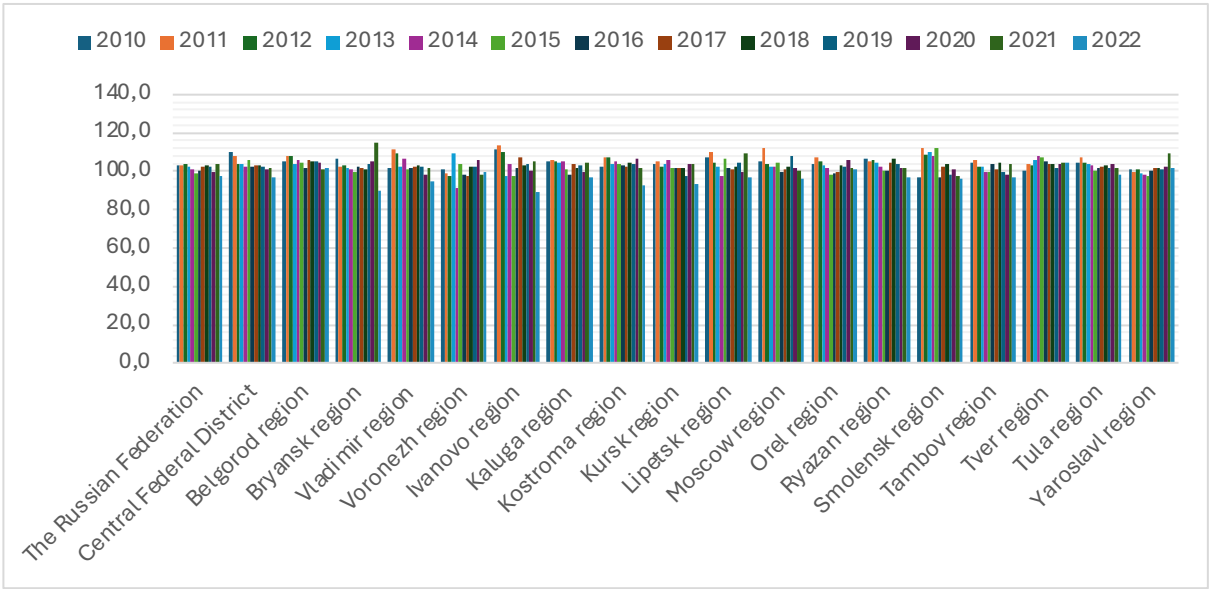

Figure 6. Dynamics of the labour productivity index (in % to the previous year) in the CFD regions, 2010-2022

Source: composed by the authors according to Rosstat data[4]

[4] *The data are given according to Rosstat. Section: Efficiency of the Russian economy. Available at: URL: https://rosstat.gov.ru/folder/11186 (accessed: 01.05.2024) (in Russian).*

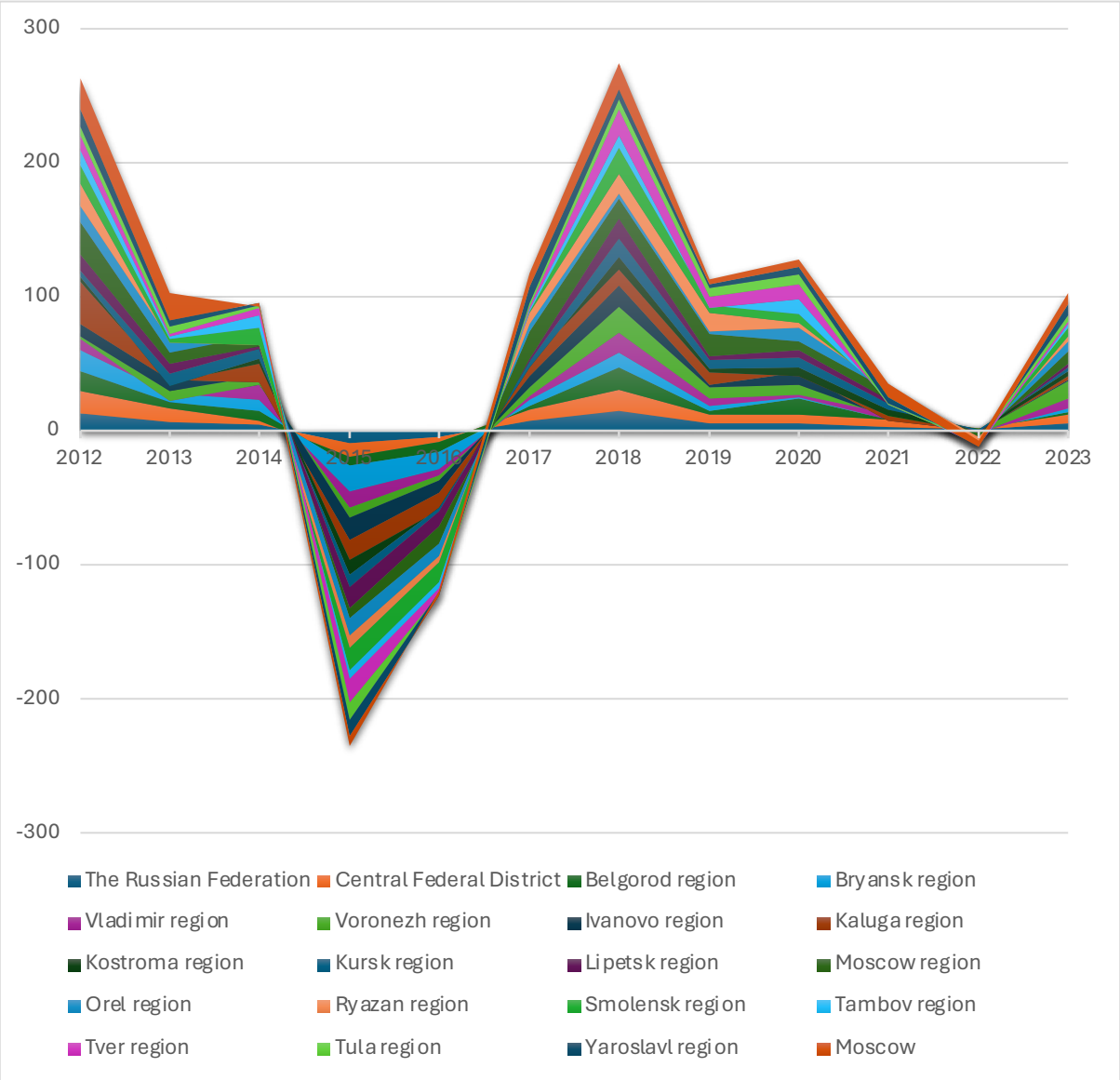

Figure 7. Dynamics of growth of high-productive jobs (in % of the previous year) in the regions of the Central Federal District, 2012-2023

Source: composed by the authors according to Rosstat data[5]

Results

Figures 8-9 (visual interpretation) and Table 1 (analytical interpretation) present the results of the correlation analysis.

Table 1 – Results of correlation analysis

p-val	power	Parameter pairs	Interpretation of the relationship	Significance of the relationship	Correlation between indicators
0.147533	0.30548	LIAO vs LPI	Not relevant		
0.000531	0.936499	LIAO vs GHPJ	Weak	Significant	Direct
0.00255	0.857651	SOITI vs LPI	Very weak	Significant	Inverse
6.47E-05	0.9806	SOITI vs GHPJ	Weak	Significant	Direct

[5] *The data are given according to Rosstat. Section: Efficiency of the Russian economy. Available at: URL: https://rosstat.gov.ru/folder/11186 (accessed: 01.05.2024) (in Russian).*

p-val	power	Parameter pairs	Interpretation of the relationship	Significance of the relationship	Correlation between indicators
0.149741	0.302734	VIGWS vs LPI	Not relevant		
0.08915	0.398886	VIGWS vs GHPJ	Not relevant		
0.499684	0.103632	CIAO vs LPI	Not relevant		
0.115315	0.351325	CIAO vs GHPJ	Not relevant		
0.433652	0.122789	SSEITI vs LPI	Not relevant		
0.027942	0.599699	SSEITI vs GHPJ	Weak	Significant	Direct

Source: composed by the authors

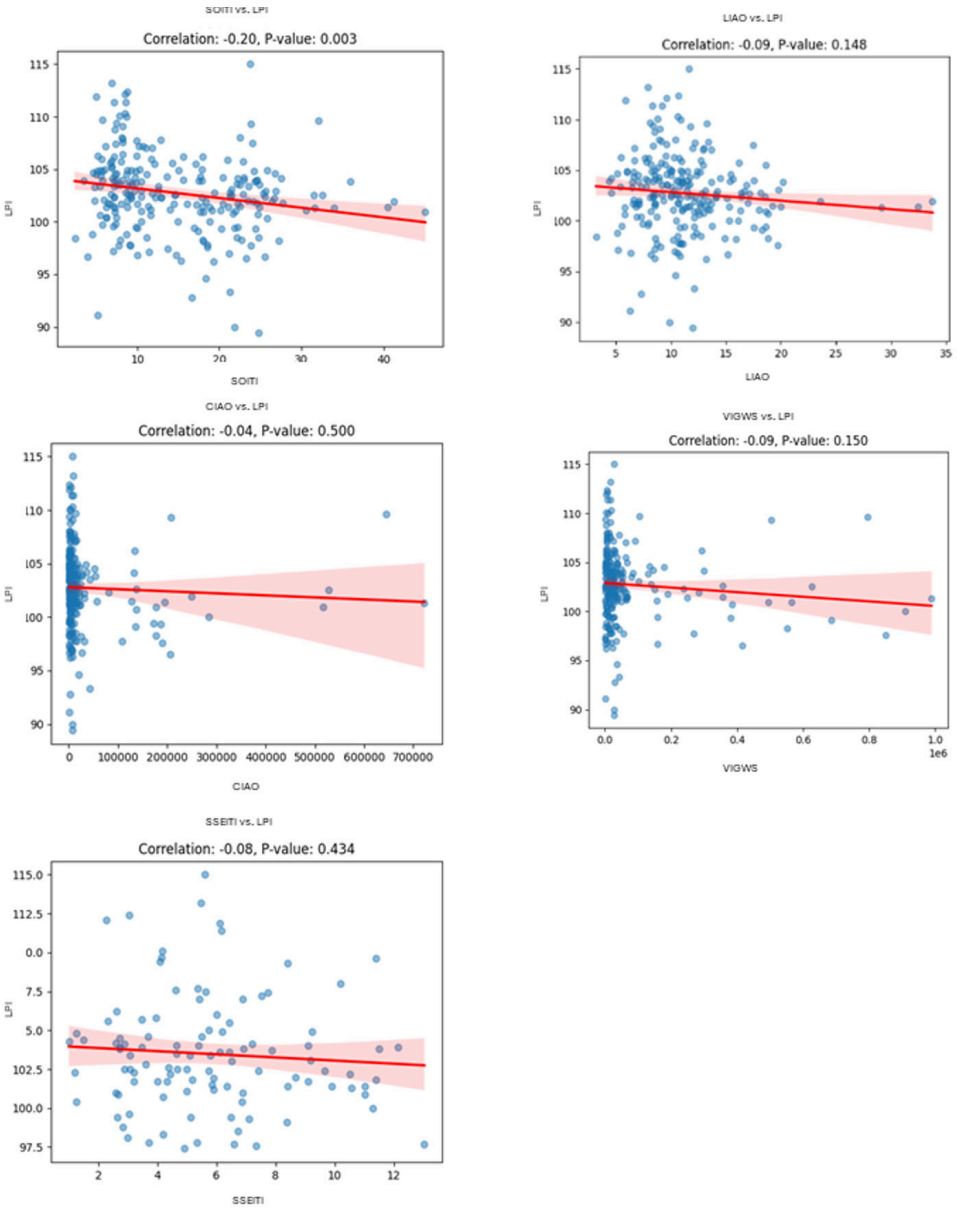

Figure 8. Scatter diagram between the indicators under study

Source: composed by the authors

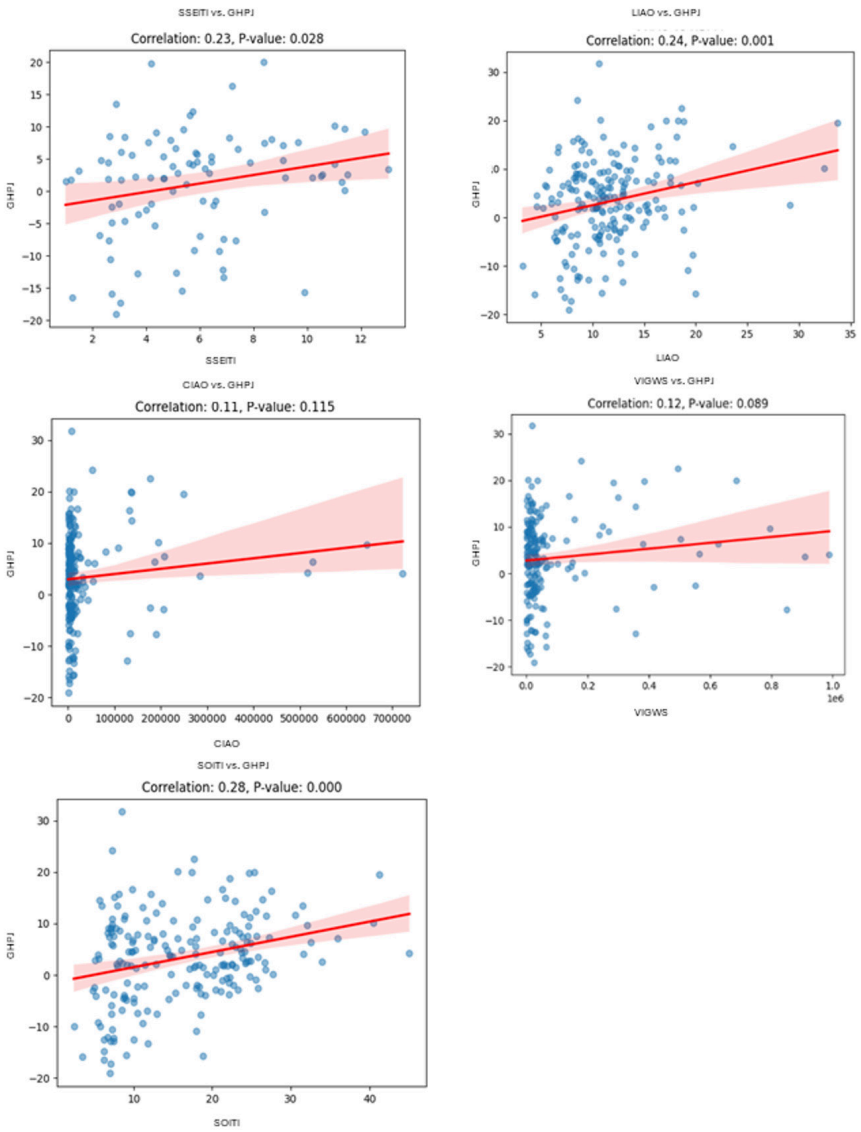

Figure 9. Scatter diagram between the indicators under study
Source: compiled by the authors

According to the research results, the parameters of SME innovation activity do not have a significant impact on the dynamics of socio-economic development of the CFD regions.

Conclusion

As a result of the research conducted, we found the following:

- there is a weak statistically significant direct relationship between the level of innovation activity of organisations and the growth of high-productive jobs in the CFD regions;
- there is a very weak statistically significant inverse relationship between the share of organisations implementing technological innovations and the labour productivity index in the CFD regions;
- there is a weak statistically significant direct relationship between the level of innovation activity of organisations and the growth of high-productive jobs in the CFD regions;
- there is a weak statistically significant direct relationship between the share of small enterprises implementing technological innovations and the growth of high-productive jobs in the CFD regions.

In general, the results obtained contradict earlier studies [1-11] and do not support the proposed research hypothesis.

The obtained (negative) results can be explained by the low level of knowledge-intensive products in the total GRP structure of the analysed regions; the small importance of SMEs for the Russian economy (compared to developed countries)[6].

Research limitations:

- data discontinuity skewing the overall picture by the impact of the coronavirus pandemic and subsequent lockdown in 2020 and 2021;
- external shocks that have a significant impact on the dynamics of socio-economic development of the CFD regions;
- perhaps, the use of correlation analysis for solving the research objective was not optimal one (the research methodology is being tested and searched).

We believe, the data obtained will activate a new wave of applied research on the impact of innovation on regional economic development dynamics.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Marina A. Mayorova – conceptualization, project administration, writing – original draft.
Maksim I. Markin – formal analysis; visualization.
Alexander Y. Zaytsev – data curation, investigation.

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Evolution of anti-crisis management of the organization in modern conditions

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ORIGINAL ARTICLE

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Abstract. The article deals with the dynamics of the theory of anti-crisis management of the organization (ACM) in modern conditions. The basic classifications of types of anti-crisis management are considered, their comparative analysis is carried out, conclusions are made that in modern conditions anti-crisis management of an organization is inseparably connected with its sustainable development, therefore, it comes to a new level, becoming a part of strategic management and especially actual today change management. The levels of anti-crisis management of the organization are marked out. The article pays special attention to the ambiguity of interpretation of the concept of «crisis of the organization». It is necessary for formation of effective anti-crisis strategy of the organization to understand the essence of its basic concept – crisis, the research of its genesis and modern interpretations. The study of economic literature has shown that the understanding of crisis is ambiguous. There are two main positions have been formed in studies on the problems of crisis management to understand the nature of the crisis. One group of authors (E.M. Korotkov, T.N. Rogova, V.K. Krutikov, K.V. Baldin, S.E. Kovan, etc.) focuses on the negative manifestations of the crisis, its destructive function. Other researchers (A.S. Bolshakov, V.Y. Zakharov, A.D. Chernyakhovsky, N.D. Koryagin, A.S. Lifshits, V.M. Pishchulov, etc.) consider crises as a contradictory phenomenon and analyse their positive sides and creative role. The dual nature of crises predetermines the multi-purpose orientation of ACS and multifunctionality of its content. This is the peculiarity of the anti-crisis management system. The unified ACM system includes tools for crisis prevention, diagnosis, overcoming the crisis, enterprise restructuring strategy, methods of crisis prevention, methods of forecasting and planning, strategic management, as well as non-standard methods of personnel management. The author notes that crisis management tools should be integral components of sustainable enterprise development strategies.

Keywords: crisis management; crisis theory; crisis of organization; organization life cycle theory; sustainable development of organization

JEL codes: H12, M11, O32

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Introduction

In modern conditions of economic management of domestic enterprises, which are characterized by a high degree of uncertainty and increased aggressiveness of the external environment, cyclical occurrence of crisis phenomena, threats of globalization, integration transformations, the issues of crisis management are of particular importance, underestimation of the importance of which restrains the pace of enterprise development, and in extreme cases may lead to the termination of its activities. Ensuring the efficiency of functioning and sustainable development of any business entity is determined by its ability to respond in a timely manner to various crisis situations, the ability to choose rational alternatives of anti-crisis measures based on the maximum use of available potential.

It is necessary to understand the essence of its basic concept to form an effective anti-crisis strategy of the organization – crisis, the study of its genesis and modern interpretations. The study of economic literature has shown that the understanding of crisis is ambiguous.

The purpose of this paper is to show the dynamics of crisis management at the enterprise level, taking into account the dual understanding of the term "crisis" and the expansion of the areas of crisis management in enterprise management, as the relevance of these processes is rapidly growing in modern conditions.

The article analyzed the scientific works of the most significant specialists in crisis management,

studying this subject for many years. The following regularity is noted: two groups of authors emphasizing different sides of the concept of "crisis": negative and positive.

Initially, the essence of economic crises was considered at the macroeconomic level in the framework of the theory of economic cycles, which was developed by economic scientists in the XIX-XX centuries, including K. Zhuglar, K. Marx, N.D. Kondratiev, J.M. Keynes, J. Schumpeter, D. Hicks and others. Researchers of the XIX century attributed the cause of medium-term (industrial) crises to periodically arising processes of overproduction of enterprises' products, to the shortage of demand, to the aggravation of the problem of sales of goods. K. Marx explained the crises by the aggravation of the contradiction between the public nature of production, i.e. the universal interrelation of macroeconomic processes, and the private nature of appropriation of production results [11]. Foreign researchers of the XIX-XX centuries proposed various theories of the economic cycle (and, consequently, the crisis as a «turning point from contraction to expansion») depending on the main, in their opinion, cause: the monetary theory, the theory of innovation, the psychological theory, the theory of under consumption, the theory of overinvestment, the theory of «sunspots – weather – harvest» [18].

«Classical» understanding of the crisis, formed at that time, meant a separate stage of functioning of the market economy, characterized by a decline in the economy and negative phenomena in the spheres of production, trade, finance.

In modern economic literature there are different approaches to understanding the essence of the crisis, its nature, which reflects the multifaceted nature of this concept. Let us consider some definitions.

In the Large Encyclopedic Dictionary the concept of «crisis» is interpreted as «...a sharp, abrupt break, a difficult transitional state» [15]. This approach emphasizes the possibility of «transition», as it implies a way out of this «heavy state». Other modern dictionaries also interpret the term «crisis» as a moment that separates what was before from what will be after; a turning point, a turning moment; a very dangerous, threat-filled situation that requires an immediate solution. Such interpretation is close to the authors of foreign books on economics and macroeconomics [18].

There are two main positions have been formed in studies on the problems of crisis management to understand the nature of the crisis. One group of authors (e.g., E.M. Korotkov, T.N. Rogova, V.K. Krutikov, K.V. Baldin, S.E. Kovan, etc.) focuses on the negative manifestations of the crisis, its destructive function. Other researchers (A.S. Bolshakov, V.Y. Zakharov, A.D. Chernyakhovsky, N.D. Koryagin, A.S. Lifshits, V.M. Pishchulov, etc.) consider crises as a contradictory phenomenon, analyse their positive sides and creative role.

Main pat

1. The focus on the negative impact of the crisis

Characterizing the essence of the crisis, T.N. Rogova states that «crisis is a major decline of the entire financial and economic system (production, trade), reflected in the growth of unemployment, reduction in consumption, bankruptcy of many firms, a sharp decline in the scale of capital investment» [16]. The emphasis in this understanding of the crisis is placed on its negative effect. We should note that this approach to the definition of the essence of the crisis characterizes this concept mainly at the macro level, and the role of the enterprise in this process is not specified.

E.M. Korotkov gives a general definition of crisis, taking into account the complexity of this concept: «Crisis is an extreme aggravation of contradictions in a socio-economic system (organization), threatening its viability in the environment» [7]. This definition links crisis to the real danger for the organization.

Undoubtedly, the crisis is a turning point, a consequence of the aggravation of contradictions in the socio-economic system (in the organization), but it reflects not only a difficult and dangerous state of the system (i.e. negative phenomena), but also positive opportunities associated with the release from the outdated, outmoded, opportunities and motives for renewal. We believe that the destructive function of the crisis manifests itself in the low readiness or unpreparedness of the system for the emergence of various crisis situations, in the absence of appropriate timely response from the management of the organization. In this case, there is a threat of system destruction, i.e. bankruptcy and liquidation of the business entity.

In our opinion, the negative characterization of the essence of the crisis is rather one-sided. Undoubtedly, the crisis adversely affects all spheres of enterprise activity, the national economy as a whole. However, the crisis opens the possibility of a «new round of development», because there is a targeted motivation of enterprises to maintain viability and presence in the market, which gives an impetus to innovation and leads to the emergence of new qualities of the system.

2 The emphasis on the healing function of the crisis, an impetus to development

J. Schumpeter, considering crises in connection with economic cycles, noted that «crises are a natural state of the organism, which, when it grows and develops, gets sick and then recovers. Therefore, the crisis brings with it not only indisposition, but also renewal» [8].

French economists T.K. Poshan and E.M. Morin emphasize that the «manifesting» function of the crisis is positive, as it allows the objects of research to improve their activities and mobilize efforts aimed at change» [12].

N.D. Koryagin, analyzing the essence of crisis, emphasizes its dual nature, «which simultaneously creates and destroys, forms preconditions and prepares conditions for further development. ...Any crisis conceals in itself the possibility of getting out of it, i.e. it is not only and not so much a purely negative phenomenon, but a break, a transition to another state – from the orderliness of the previous period to the orderliness of the next through the chaos of destruction and transformation of outmoded elements». Crises, according to the scientist, are progressive, because they carry out «the elimination of elements of the system, which has exhausted its development potential, and make room for strengthening the elements of a new system ...» [8].

I.V. Kachalov [5] notes the positive qualities of the crisis in the organization, consisting in the possibility of finding promising market segments and niches.

Modern researchers draw attention to the need for a dynamic approach to the analysis of the nature of the crisis, linking it to the stages of development of the system, the stages of the life cycle of the organization, the types of development.

In this regard, when analyzing the nature of crisis in an organization, researchers (A.D. Chernyakhovsky, E.M. Korotkov, N.D. Koryagin, A.S. Lifshits, etc.) should pay attention to the allocation of two dialectically interacting trends in the existence of a firm (enterprise): functioning and development. If functioning implies maintaining a certain stability in the life of the enterprise, preserving its integrity, providing the necessary resources and their proportionality, then development is associated with the factors of renewal, acquisition of new quality of the system, changes in the resource base, in personnel, with the application of new technologies, strengthening motivation. The source of crises can be both the contradiction between these opposite tendencies and each of them by itself [7]. Thus, we can point to the existence of crises of functioning and crises of development.

N.D. Koryagin, analyzing the main conceptual approaches to understanding the crisis, points to the interpretation of the crisis in modern Russian literature as «the result of aggravation of contradictions of functioning and development of socio-economic system». The author considers these processes as a dialectical unity of the main components of the socio-economic system. «Development destroys many processes of functioning, but at the same time creates conditions for the emergence of new ones, functioning limits development, but at the same time nourishes it» [8].

Developing this topic, A.S. Lifshits notes that «the distinction between functioning and development is of fundamental importance from the position of choosing the directions, means and technologies of anti-crisis management... Development crises are strategic crises, crises of economic, social and environmental potentials of the organization [10].

Analyzing the nature of the crisis of a socio-economic system, a number of authors (Koryagin, Pischulov, etc.) define it as a stage in the cyclical development of this system.

V.M. Pischulov, considering the crisis, defines it as a separate phase of the life cycle along with depression, rise and peak [13].

N.D. Koryagin notes: «Crisis is just a stage in the development of a system, after which quantitative changes pass into qualitative ones. ... Crisis is a natural and necessary stage of development» [8].

In our opinion, analyzing the manifestations of the crisis, we can note the possibility of crisis at each stage of the life cycle of the enterprise (birth, growth, maturity, aging).

Analysis of the causes and manifestations of crises in interaction with the issue of the stages of the life cycle of the organization is carried out by a number of researchers, among them are L. Greiner, I.K. Adizes, E.M. Korotkov, N.D. Koryagin, A.S. Lifshits and others. We agree with the position of these authors that the emergence of a crisis is possible at any stage of the life cycle.

To understand the nature of development crises, the reasons for their occurrence and to determine the possibilities of their management, the evolutionary model of the life cycle of an organization (the model of stages and crises of organizational growth) proposed by L. Greiner is of interest [14]. The American economist identified 5 stages of growth in the evolution and revolution of a socio-economic system. According to Greiner's model, the age and size of the organization determine the dominant type of management. With the increase in the size of the organization at each stage of its evolutionary growth, a crisis may occur due to the need to transition to a new type (style) of management. In the course of the organization's development, organizational and managerial crises arise – leadership, autonomy, control, red tape (boundaries), trust. These crises give birth to sources of new growth of the organization: growth through creativity (through creation, creative, intuitive management and enthusiasm); growth through transition to directive management and introduction of formal communication systems; growth through delegation of authority and decentralization of the organizational structure; growth through coordination; growth through development of cooperation.

I. Adizes, an American professor and expert in the field of change management, proposed a 10-stage model of an organization's life cycle, the criteria in which are flexibility (characteristic of variability) and controllability (characteristic of manageability). The older a company is, the more strictly it is controlled and becomes less flexible. The optimal combination of these parameters is reached at the stage of prosperity, so the task of management is to reach this stage and stay there as long as possible.

According to Adizes' concept, the main factor in the success of an organization is its ability to cope with the problems that arise at each stage of the cycle. Thus, he identifies the relationship: growth of the organization – change – problems. I. Adizes connects the causes of crises with the presence of problems in the organization during the transition from one stage of the life cycle to another. According to the degree of «solvability», problems can be «normal», which are resolved in the course of progressive development; «abnormal», when there are difficulties in their resolution, weakening its ability to develop and requiring external intervention; «pathological», which create a threat to the existence of the organization. It is the abnormal and pathological problems that characterize the crisis in the organization [1].

A.S. Lifshits connects the problems that give rise to crises with the types of possible development of the enterprise, noting that «the interpretation of the crisis should be linked to the concepts of «abnormality» or pathology. Normal problems – problems of progressive development, abnormal problems – problems of gradual regressive development, pathological problems – problems of developed, including rapid regression, leading to partial or complete loss of functionality and threatening the viability of the organization». The author believes that a crisis can occur at most stages of the life cycle, overlap with the stage of the life cycle, or represent the essence of any of the stages. «Overlapping» of the crisis on the stage of the life cycle exists at the progressive development of the enterprise and the presence of abnormal problems; pathological problems generate a crisis at regressive stages of the life cycle of the enterprise [10].

A reflection of the dynamic approach to the interpretation of crisis is that it is not seen as something unchangeable, but as a process that goes through several stages of its own development. This process is complicated by the fact that crises can arise at any stage of an organization's life cycle and can occur simultaneously; moreover, one crisis can give rise to others, and a whole chain of crises emerges.

The dynamic approach to the analysis of the essence of crisis, consideration of the phenomenon of crisis as a multistage process, as well as proof of the possibility of its occurrence at any phase of the life cycle of the organization – all this forms certain requirements to the anti-crisis policy of the enterprise. This policy should be focused not only on overcoming negative symptoms in the phase of acute crisis, getting out of the phase of chronic crisis, it should be aimed at preventing crisis situations, identifying the hidden crisis, and more

broadly – provide a whole system of measures to support the sustainable development of the organization.

The issue of the causes of crises in the organization is quite widely covered in the literature on crisis management. We agree with the statement of a number of authors that the root cause of the crisis is the growth and aggravation of the contradiction between the elements of the internal environment of the organization and the requirements of the external environment. Researchers divide various reasons into objective and subjective, external, independent of the activities of the enterprise, and internal, directly dependent on the activities of the enterprise, its management.

Most authors attribute objective causes of the crisis to cyclical needs for modernization and restructuring, and subjective causes to mistakes and shortcomings in management. E.M. Korotkov also distinguishes between natural and accidental, natural and artificial causes of crises, while N.D. Koryagin's work singles out force majeure – natural disasters – as an independent group. As part of the internal causes, he distinguishes 3 groups of factors – managerial, production and market. The author emphasizes that managerial factors have the greatest impact on the state of crisis [8]. A.T. Zub singles out 17 events – internal specific reasons provoking a crisis at an enterprise [20], and this is, of course, an incomplete list of them.

It should be noted that identification of the immediate causes that led to the crisis situation, their differentiation is of fundamental importance for the development of anti-crisis management measures.

There are several stages in the development of the domestic theory of anti-crisis management, differing in the formulation of the main tasks and understanding of the content of anti-crisis policy. At the stage of formation of ACM (in the 1990s and early 2000s) the exit from the crisis and the implementation of measures for financial recovery, prevention of bankruptcy of the enterprise, bankruptcy procedures through arbitration management was considered as its main task. In this period, anti-crisis policy was interpreted as a system of measures to get out of the crisis of the enterprise, aimed at the recovery of the enterprise in crisis. As a rule, within the framework of this approach the crisis was considered as an independent stage in the functioning of the enterprise. For example, this approach to the interpretation of anti-crisis policy prevailed in the economic literature on the problems of financial recovery of the enterprise [9].

V.E. Kerimov links ACM activities with overcoming crisis situations. He notes: «Anti-crisis management, on the one hand, allows preventing the deterioration of financial and economic results of commercial organizations, and on the other hand – to create conditions for assisting enterprises in crisis situations to bring them out of crisis [6].

Investigating the problem of crisis management from the perspective of the financial activity of the enterprise, V.E. Kerimov distinguishes the following types of its types due to the different financial condition of the enterprise:

- early crisis management – actions are aimed at preventing a crisis;
- anticipatory anti-crisis management is implemented when the financial condition of the organization deteriorates;
- crisis management during insolvency arises when the company's financial capacity declines;
- anti-crisis management during the period of financial rehabilitation and external management is focused on restoration of solvency, repayment of debts to counterparties;
- crisis management during bankruptcy is carried out if the organization is declared bankrupt.

Later, since 2007-2008, the understanding of the ACM content has been significantly expanding, it began to be considered as a set of methods and tools aimed not only at counteracting crisis situations arising at the enterprise, but also as a set of preventive measures that prevent the emergence of crisis, stabilize the situation and ensure further development of the socio-economic system. At the same time, the sphere of ACM has spread to the meso- and macro-level [17]. Among researchers there is an opinion according to which ACM is a system of measures to prevent a crisis, eliminate its negative consequences, to prevent a crisis at the emergence of its threat and to forecast crisis situations.

Thus, E.M. Korotkov indicates two goals of ACM; in his opinion, on the one hand, such management allows to anticipate crises, on the other hand, to mitigate their consequences and use the factors of crises for the development of the organization. «Anti-crisis management is a management in which the anticipation of

the danger of crisis, analysis of its symptoms, measures to reduce the negative consequences of the crisis and the use of its factors for subsequent development are put in a certain way» [7]. N.D. Koryagin identified two types of ACM depending on the content of measures: reactive and preventive. At the same time, he considers the crisis itself as a multistage process. At the stage of acute crisis, reactive crisis management is implemented, the purpose of which is to restore the pre-crisis state. Preventive, or proactive ACM involves «assessing the probability and consequences of potential crises, development of anti-crisis strategy, implementation of action plans to prevent crises» [8].

In the second half of the 2010s, an even broader view of the content of crisis management was formed in the ACM theory – anti-cyclical crisis management as a system of anticipatory measures aimed at crisis prevention. The purpose of such a policy is to ensure crisis-free development of the enterprise. According to this understanding, ACM is a comprehensive system of measures that prevent crisis situations and aimed at the sustainable functioning of the enterprise and its development [14, 17].

It should be emphasized that each subsequent ACM concept does not cancel the previous ones, but includes them, and the range of tasks solved by each type of policy becomes wider and more complex (fig. 1).

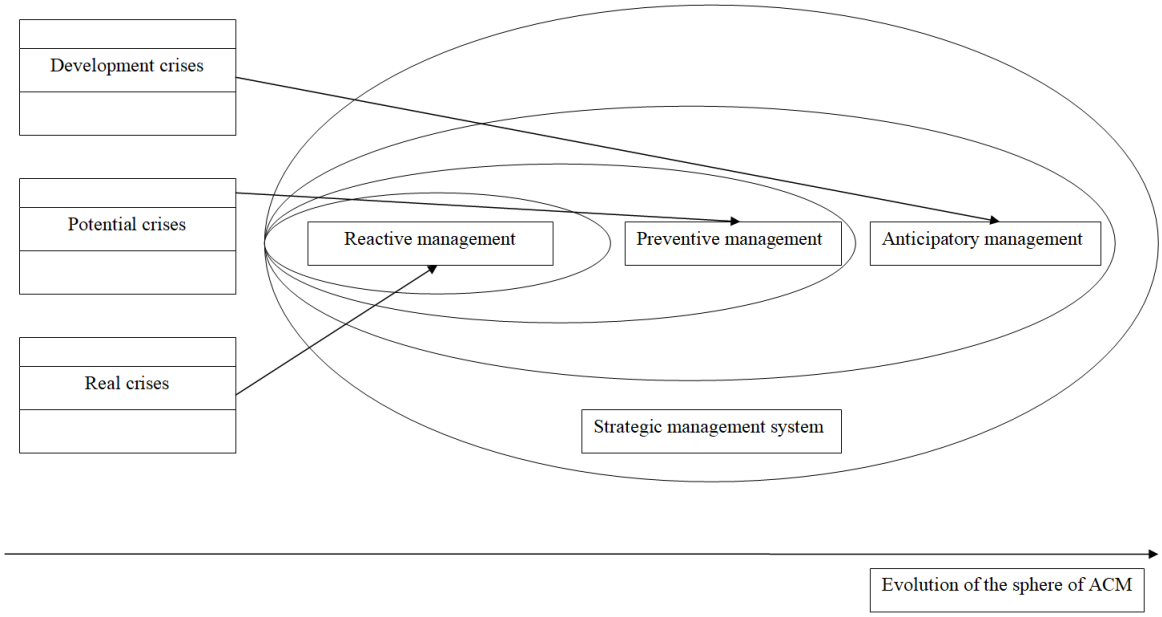

Figure 1. The evolution of types of anti-crisis policy

Source: composed by the author

Thus, we can indicate 3 levels of ACS as a system of management methods and tools, differing in the goals of anti-crisis policy, the breadth and complexity of its activities:

Level 1 – ACM as a system of measures to get out of the crisis, to overcome the crisis situation in the organization, its goal is to restore the pre-crisis state (reactive crisis management).

Level 2 – ACM as a system of measures to prevent, anticipate and avoid crisis situations, its goal is crisis prevention (preventive crisis management). Such management provides for monitoring of the state of external and internal environment factors, application of situational analysis methods.

Level 3 is the most complex, «anticipatory management», which involves a system of measures to ensure sustainable development of the organization, anticipation of changes and timely «restructuring» of work, application of forecasting tools and expansion of the planning horizon (anticipatory management). Such management covers all areas of the organization's activities and all functions, involves tracking, recognition, evaluation and overcoming of hidden uncertainties, the policy of «flexible development of the enterprise».

The crisis associated with the COVID-19 epidemic [3] had a special impact on the revision of views on crisis management. This crisis affected absolutely all economic entities. Especially small and medium-sized enterprises were affected [4], the potential of which was insufficient to regulate the situation. The most acute issues were issues related to logistics, supply chain of raw materials, equipment and other production

links. Only a comprehensive and systematic approach to crisis management allowed enterprises not only to maintain their positions in the market, but also to make a leap forward [4]. In a rapidly developing situation, risks have increased, requiring high-quality preventive crisis management. In particular, the well-known Russian economist A. Aganbegyan believes that the experience of the coronavirus pandemic allowed to make a significant leap in the development of crisis management, as the developed systems of measures proved to be effective not only at the country level, but also within individual enterprises [2].

The dual nature of crises predetermines the multi-purpose orientation of ACM and multifunctionality of its content. This is the peculiarity of the crisis management system. The unified ACM system includes tools for crisis prevention, diagnosis, crisis overcoming, enterprise restructuring strategy, crisis prevention methods, forecasting and planning methods, strategic management, as well as non-standard methods of personnel management.

With a certain convention, let us distinguish the goals and objectives of ACM, as well as its instruments and objects of influence depending on its type (Table 1).

Table 1 – Comparison of ACM types

Type of ACM	Objectives	Main tasks	Key methods and tools	Object of influence
1.Reactive	Exit from the crisis situation. Overcoming the real crisis.	Blocking negative crisis processes. Development of a system of anti-crisis measures and their implementation. Transition to a new operating model adequate to the requirements of the external environment.	Diagnosis of the main problems. Anti-crisis strategy. Rehabilitation. Restructuring.	A real crisis. Scope of the emergence of the crisis of functioning and all its communications. Changing the company's strategy.
2.Preventive	Prevent abnormal and pathological problems, prevent crisis situations.	Timely identification of growing negative problems and changes in the internal and external environment. Developing possible responses. Monitoring the functioning of all processes, their timely adjustment. Mitigation of acute crisis processes when they cannot be prevented.	Diagnosis of key indicators. Monitoring of functioning and development processes. «Weak signal» control. Planning and forecasting.	Potential Crisis. Spheres of production, marketing, finance, management organization. Changes in the company's strategy.

Type of ACM	Objectives	Main tasks	Key methods and tools	Object of influence
3. Anticipatory	Ensuring crisis-free, sustainable development.	Development of a set of measures (changes in the organization) to prevent (or minimize) possible losses. Ensuring sustainable financial and economic development of the organization	Diagnosis, complex analysis. Monitoring of functioning and development processes. Planning and forecasting. A set of strategic management methods.	Developmental Crisis. Internal and external environment of the enterprise. Economic potential. Enterprise management system. Changes in the company's strategy.

Source: composed by the author

Conclusion

The peculiarity of modern conditions of enterprises' activity is the high speed of changes in the external environment, instability and instability. The ongoing changes are caused by geopolitical factors, the increasing pace of technological transformation, the active process of digitalization, the development of telecommunications and information technologies. All this increases the level of complexity of company management, imposes high demands on the enterprise management, its competence, flexibility, creativity.

Based on the study of sources on the issues of crisis in the organization and anti-crisis policy, the paper shows the advantage of dialectical and dynamic approaches to their interpretation. From the dialectical position the essence of crisis is in the unity of its negative and positive sides, destructive and health-improving, creative function. Crisis is the result of the aggravation of contradictions between the elements of the internal environment of the organization and the requirements of the external environment; crisis should be considered as a dynamic process that accompanies all stages of the life cycle of the organization.

Analysis of the evolution of scientific views on anti-crisis management at the enterprise (ACM) allowed us to distinguish its three types (levels):

1) reactive ACM, carried out in the conditions of a real crisis, providing for a system of anti-crisis measures for recovery;

2) preventive ACM, the object of influence of which is a potential crisis; the accents in such management are diagnostics and monitoring, management "on weak signals";

3) anti-cyclical anti-crisis management aimed at preventing, anticipating pre-crisis phenomena, creating conditions for crisis-free and sustainable development. The main tools for implementing this policy are diagnostics, complex analysis, monitoring of processes, planning and forecasting, strategic management methods.

It should be emphasized that each level of ACM does not cancel the previous ones, but includes them, the range of tasks solved by each type of management becomes wider and more complex. We believe that all levels of ACM should be present in the management practice of a modern enterprise. Firstly, risks in the activities of the enterprise due to both external and internal factors always exist, and the probability of a crisis situation is significant. Secondly, the most important goal of effective management in the rapidly changing external and internal environment nowadays is to ensure the sustainability of the organization's development. We believe that crisis management tools should be integral components of sustainable development strategies of the enterprise.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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Improvement of the strategy of insolvent organisations crisis recovery

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ORIGINAL ARTICLE

Abstract. The article presents the research results aimed at strategic management of an insolvent organisation to overcome the financial and economic crisis. Nowadays enterprises in Kazakhstan often have challenges with ensuring financial stability and solvency. As a result, many organisations become uncompetitive. It can cause a business bankruptcy. The article highlights modern issues of ensuring domestic commercial organisations financial stability. The paper proposes solutions available to improve an economic efficiency mechanism for managing the financial condition of insolvent organisations. Therefore, an integrated approach to the development and implementation of strategies to recover insolvent organisations from crisis includes financial recovery, optimisation of operational processes, management reorganisation, reorientation to new markets and products, strengthening marketing activities, and improving corporate culture. Each of these strategies is aimed at stabilising the financial condition, increasing efficiency, and competitiveness. The implementation of these strategies requires all organisation departments coordinated actions and adaptation to current economic conditions.

Keywords: solvency; insolvent organisation; crisis of the organisation; anti-crisis management and strategy

JEL codes: M1, O11, O21

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Introduction

Nowadays, the main trend is a decrease in demand. It cause decreasing in organisation sales and revenue. The economic instability of the external environment has a negative impact on macroeconomic and microeconomic processes. One of the consequences is a decrease in the financial stability and solvency of organisations. The modern period of economic development can be described as post-crisis. It is due to the negative impact of COVID-19, economic and political processes on the business activities. The main directions of economic development are the transition of business to effective anti-crisis management, reorientation to new sales markets, search for ways to optimize production, containing costs and expenses [1-9].

For instance, according to Lipatova Yu.M. and Pochekaeva O.V., «to increase solvency and profitability, the following measures are recommended:

- sales revenue increasing from the sale of products, works, and services;

- outsourcing of non-core activities (for example, repair and communications);
- sale of fixed assets;
- leasing of fixed assets» [1].

According to Vasilyeva N.K., Takhumova O.V., Tretyakova V.V., and Karpenko I.S. «as theoretical and practical directions, the following ways can be proposed to improve the efficiency of financial and economic activities of the company:

1. preliminary analysis of the partner solvency (verification the financial statements of the prospective partner);

2. implementation of settlements regular monitoring in terms of debtors and their obligations (analysis of accounts receivable);

3. partners rating according to degree of their reliability (assessment of the maturity of their obligations, the presence of overdue debts, etc.);

4. development of a system for the supply of goods and products after individual prepayment (for example, for new partners and debtors with overdue debts);

5. purchase of a program for access services allowing to assess partner's financial condition (1SPARK Risks; Seldon.Basis; Casebook.ru; Sberbank verification service, etc.);

6. providing discounts, delays in case of full payment or advance payment» [2].

However, we agree with V.S. Martyanov's «main measures to increase organisation liquidity. They are as follows:

- the maximum possible reduction in the value of accounts receivable;
- increased profits;
- optimisation of the company's capital structure;
- reduction of tangible assets value» [3].

Indeed, Bannova S.E. and Vizgalina A.A. highlight the following: «the main purpose of anti-crisis management of construction organisations is to develop and implement a program of measures aimed at preventing the practical implementation of negative situations, ensuring company financial stability, and a competitive position in the market with changes in the external and internal environment. The basis for the organisation's crisis recovery consists in the systematic, organized, and coordinated teamwork in accordance with the developed anti-crisis management documents – the stages of the anti-crisis program» [4].

Moreover, we also agree with Asaliev A.M. considering the periodical significance «to mitigate state tax control measures and expand bank lending programs on loyal terms for businesses; form favorable conditions in the regions for small and medium-sized businesses aimed at property rental benefits, high-quality information and analytical support in the most significant areas of activity and problems» [5].

We also support the point of view by Moshin A.Yu. He defines anti-crisis management «as a system of management measures and solutions for the diagnosis, prevention, neutralization, and overcoming of crisis phenomena and their causes at all levels of the economy» [6].

Shcherbakova E.V. considers «anti-crisis management as a strategy allows us to establish how an enterprise can withstand changes in the external environment (which occur frequently, irregularly, and almost unpredictably); preliminary measures to maintain its viability and achieve the intended goals» [7].

However, Dolganova N.A. and Taganova N.M. form three stages to prevent bankruptcy of an enterprise. They are as follows:

1. Analytical and prognostic stage: analysis of crisis phenomena prerequisites, assessment of crisis probability, crisis identification.

2. Crisis prevention.

3. The formation of a crisis management strategy, development of measures to overcome the crisis, mechanisms for their implementation and implementation itself. Therefore, anti-crisis management is a system of tools for external and internal influences on an enterprise. It highlights the weak signs of a crisis state [8].

Researchers Vorobey A.B. and Markina Yu.V. note «the main causes of crises. They may be an external

factors, manifested by imbalances in monetary policy, unsatisfactory structures of expenses and incomes, instability in the functioning of institutional systems. The internal factors related to violations in production, financial, and marketing strategies, poor management quality, and low level of corporate culture. The information crisis is caused by a discrepancy between information and real behaviour. Corporate crisis management includes continuous monitoring of economic and financial conditions, and development of protocols to ensure the integrity of incoming information» [9].

The purpose of the study is to develop and improve strategies for the withdrawal of insolvent organisations from the financial and economic crisis. It will ensure their recovery and stability in the market. In the context of the unstable economic conditions of Kazakhstan, this research is aimed at finding management solutions to prevent bankruptcy and increase the competitiveness of organisations.

The objectives of the research are as follows:

1. Analysis of the financial stability of enterprises in Kazakhstan. Identification of the main factors affecting the solvency of organisations, identification of the causes leading to financial crises, and a decrease in competitiveness.
2. Assessment of existing crisis management techniques. The study of the strategies and methods of anti-crisis management applied in practice.
3. Development of criteria for assessing the financial condition of enterprises. Identification of indicators allowing to diagnose the crisis conditions and monitoring progress of crisis overcoming.
4. Developing strategic solutions to withdraw organisations from crisis. The formation of measures aimed at restoring solvency, optimising business processes, reducing costs, and improving management efficiency.
5. Implementation of mechanisms for managing organisations financial condition. Development of recommendations for developed strategies and management mechanisms implementation.
6. Assessment of proposed strategies effectiveness. Conducting a quantitative and qualitative analysis of implemented solutions effectiveness, their impact on organisations financial condition and their ability to ensure long-term sustainability and competitiveness.

Their implementation allows ones to establish an anti-crisis management system adapted to the specifics of economy in Kazakhstan. It contributes to increasing economic stability and improving organisations insolvency.

Methods

We used the following quantitative and qualitative methods of analysis: generalisation, systematisation, comparison, abstraction, formalisation, horizontal and vertical analysis, measurement of quantitative indicators, plotting. The Microsoft Excel program was used to process statistical data. The information base was statistical data by the National Bank of the Republic of Kazakhstan and the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, expert assessments, proceedings of scientific and practical conferences, periodicals, and Internet resources.

Results

Currently, due to the aggravation of insolvent organisations crisis, the importance of the Law of the Republic of Kazakhstan «On Rehabilitation and Bankruptcy» and scientific works in this field are increasing[1]. The Law regulates relations arising from the debtor's inability to satisfy creditors' claims, establishes the base for applying debt restructuring and rehabilitation procedures, declaring the debtor bankrupt, liquidation of the debtor without initiating bankruptcy proceedings, etc.

Nowadays, Kazakhstan requires professionals to work in public administration, public and private commercial sector in the following areas: settlement and economic; analytical and research; organisational and managerial; pedagogical and entrepreneurial ones.

Methods of crisis management, views of various economic schools on bankruptcy, rehabilitation of enterprises and the degree of their applicability in current socio-economic conditions are of great relevance

[1] *The Law of the Republic of Kazakhstan On Rehabilitation and Bankruptcy (with amendments and additions on 03.09.2023)*

for the Republic of Kazakhstan.

Kazakhstan requires professionals competent in:

– the current state of the country's economy and its evolution, objective conditions for economic crises formation, possibility to influence their development, social consequences of economic crises;

– bankruptcy procedures;

– methods of solving debt problems in a market economy;

– anti-crisis programs and their implementation;

– methods of control.

Therefore, authors of this research:

– conducted an analysis of the business activity index and the dynamics of changes in enterprises financial condition;

– formed some theoretical provisions in terms of the crisis management;

– determined the nature and types of enterprises bankruptcy causes;

– made analytical conclusions on escaping the financial crisis;

– investigated enterprises condition based on signs of bankruptcy;

– provided procedures in the implementation of crisis management.

In the article, the authors applied:

– economic style of thinking;

– scientific methods of studying the problem, phenomenon, process, data inherent in the relations of production;

– methods of statistical data analysis reflecting the current state of the economy;

– knowledge of developing an argumentative basis for the positions advanced at participation in discussions on the degree of crisis management procedures and managerial decision-making efficiency.

Effective withdrawal of insolvent organisations from the financial and economic crisis requires the development and implementation of comprehensive strategies aimed at restoring solvency and ensuring long-term sustainability. In terms of economy of Kazakhstan modern conditions, these strategies should consider specific factors affecting the financial condition of enterprises. Figure 1 shows the key strategies for overcoming the crisis of insolvent organisations.

Moreover, effective crisis management requires the integration of the strategies, their adaptation to the specifics of a particular organisation, and current economic conditions. This integrated and flexible approach allows Kazakhstan's insolvent enterprises to establish the sustainable development and long-term competitiveness.

However, there are authors [1-9] do not considering the complex nature of this particular issue. Indeed, we believe, those strategies should be comprehensive, covering financial, operational, managerial, and marketing aspects of the business.

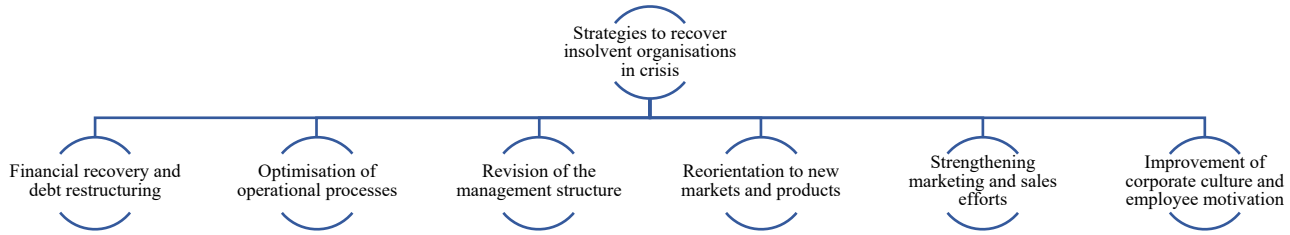

Figure 1. Key strategies for overcoming the crisis of insolvent organisations

Source: composed by the authors

Details of key strategies.

1. Financial recovery and debt restructuring.

Financial recovery involves the following actions:

– Negotiations with creditors. The organisation should actively work with creditors to change the terms of debt obligations. It may include debt restructuring, extending repayment periods, lowering interest rates,

or partially writing off debts, etc. Successful negotiations will help reduce financial pressure and improve liquidity.

– Raising additional capital. There are several ways to raise the capital, i.e., issuing new shares, attracting strategic investors, government subsidies, etc. It is important to attract long-term investments to stabilise the financial situation.

– Optimisation of asset management. The sale of non-core assets and effective working capital management can provide additional resources to support operational activities.

2. Optimisation of operational processes.

To increase operational efficiency, it is necessary to provide:

– Analysis and optimisation of business processes. The organisation should conduct a comprehensive analysis of its processes to identify and eliminate inefficient operations. For instance, it may include automation, lean manufacturing, and improved logistics.

– Cost reduction. To reduce the costs it is necessary to reduce the costs of raw materials, energy resources, and services. It is necessary to review contracts with suppliers and implement a strict cost control policy.

– Investments in technology. The introduction of modern technologies and innovations will help to increase productivity and reduce operating costs.

3. Reorganisation of the management structure.

Effective crisis management includes:

– Establishment of an anti-crisis committee. The establishment of a special committee responsible for the development and implementation of anti-crisis measures will help to respond promptly to changes and coordinate the actions of all departments.

– Revision of the management structure. Simplifying and improving the management structure to make it flexible and adaptive will allow you to make decisions faster and adapt to new conditions.

– Risk management system. The implementation of a risk management system allows ones to identify and minimise the business threats.

4. Reorientation to new markets and products.

The diversification of activities includes:

– Market analysis. Research current and new markets to identify business expansion opportunities. It includes entering international markets and finding new segments.

– Development of new products. Development of new products or services meeting current market needs will help attract additional customers and increase revenue.

– Strategic partnerships. Collaboration with other companies can help accelerate entry into new markets and optimise marketing and sales costs.

5. Strengthening marketing and sales efforts.

To increase sales and improve customer relationships, it is important:

– To reform the marketing strategy. Development of new marketing activities based on digital channels and social networks. It helps to improve brand awareness and attract more customers.

– To improve the customer service. Creating loyalty programs and personalized customer service will help strengthen ties with existing customers and attract new ones.

– To optimise the pricing policy. Adapting the pricing strategy to the current market conditions will increase competitiveness and attract more customers.

6. Improving corporate culture and employee motivation.

To increase employee engagement and productivity, there is an advisable:

– To create the motivation programs. The development and implementation of motivation programs, including bonuses, and career growth, will help to increase productivity.

– To implement a corporate culture. The formation of a positive and innovative corporate culture contributes to employee engagement and maintaining a high level of morality.

– To conduct staff training and development. Investing in employee training and development will help them adapt to changes and improve their skills.

However, there are authors [2-9] do not considering individual strategies and their elements for the recovery of insolvent organisations from the crisis. Indeed, we believe a comprehensive approach is required to develop and implement strategies for the recovery of insolvent organisations from the crisis. Therefore, we developed an integrated approach including financial recovery, optimisation of operational processes, management reorganisation, reorientation to new markets and products, strengthening marketing activities, and improving corporate culture. Each of these strategies is aimed at stabilising the financial condition, increasing efficiency and competitiveness. The implementation of these strategies requires departments coordinated actions and adaptation to current economic conditions. As a result of an integrated approach, organisations will be able to overcome the crisis, and lay the foundation for their further sustainable development.

Discussion

However, the dynamics of Purchasing Managers Index (PMI) confirms the crisis conditions. This index decreased in January 2020 to March 2021 significantly. It also accompanied by a decrease in the interest of entrepreneurs to increase production[2].

In Kazakhstan, Purchasing Managers Index (PMI) increased from 50 (February) to 51.7 (March 2023). There are problems with supplies. Enterprises, except for the mining sector, note an increase in the volume of orders and inventories. Purchasing Managers Index (PMI) characterises the economy state, reflects the actual changes in enterprises economic indicators, and expects their changes in the future. In March 2023, the National Bank conducted a survey of 517 large, small, and medium-sized companies.

In general, Purchasing Managers Index (PMI) in the sectors of Kazakhstan economy increased (except the mining industry). PMI in the mining industry increased slightly from 46.7 to 48.6. However, the indicator remains negative one. Market participants associate it with prolonged deliveries, lower employment rates and reduced volume of new products.

PMI in manufacturing transited from negative values (2020 and 2022) to positive ones. PMI increased by 3.3 points compared to February 2022 and amounted to 53.1. PMI in the construction and services sectors increase to 53.6 and 51.6, respectively, in February 2023. PMI in the construction and services sectors in February 2022 were 51.9 and 50.7, respectively[3].

The expectations of market participants regarding business conditions have improved. The Business Climate Index is an average assessment of current and future business conditions has improved, too. The Business Climate Index increased from 12.8 in February to 16.5 in March 2023. In the future enterprises in Kazakhstan expect more favorable business conditions.

The business activity index of Kazakhstan's manufacturing industries, against the background of rising demand and an increase in the number of new orders, increased from 51.2 points in February to 51.6 points in March 2023. The growth rate continues throughout the first half of 2023[4].

Figure 3 shows data on the number of debtors at the stage of rehabilitation or bankruptcy in 2015-2020, the Republic of Kazakhstan

Figure 4 shows the gross profit from the sale of agricultural products in the Republic of Kazakhstan. Indeed, it indicates low gross profit from the sale of agricultural products in the Republic of Kazakhstan in 2001-2008, and in 2014-2015.

Figure 5 shows the level of profitability (loss-making) of agricultural production in the Republic of Kazakhstan. It decreased in 2011-2021.

Figure 6 shows the income from transport activities in the Republic of Kazakhstan. It decreased significantly in 2020.

Figure 7 shows the gross output of goods and services in the tourism sectors of the Republic of Kazakhstan. Its value is quite low in 2008-2020.

[2] *Bank of the Republic of Kazakhstan. URL: https://www.nationalbank.kz/ru (Accessed 10.05.2024).*
[3] *Bank of the Republic of Kazakhstan. URL: https://www.nationalbank.kz/ru (Accessed 10.05.2024).*
[4] *Bank of the Republic of Kazakhstan. URL: https://www.nationalbank.kz/ru (Accessed 10.05.2024).*

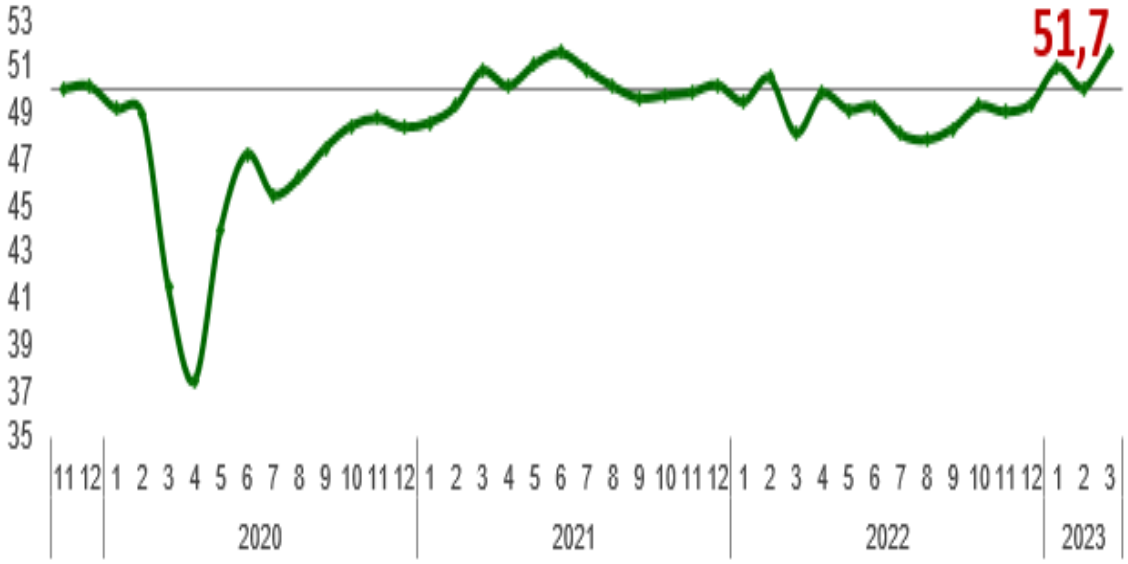

Figure 2. Purchasing Managers Index (PMI) in Kazakhstan / The National Bank
Source: Bank of the Republic of Kazakhstan

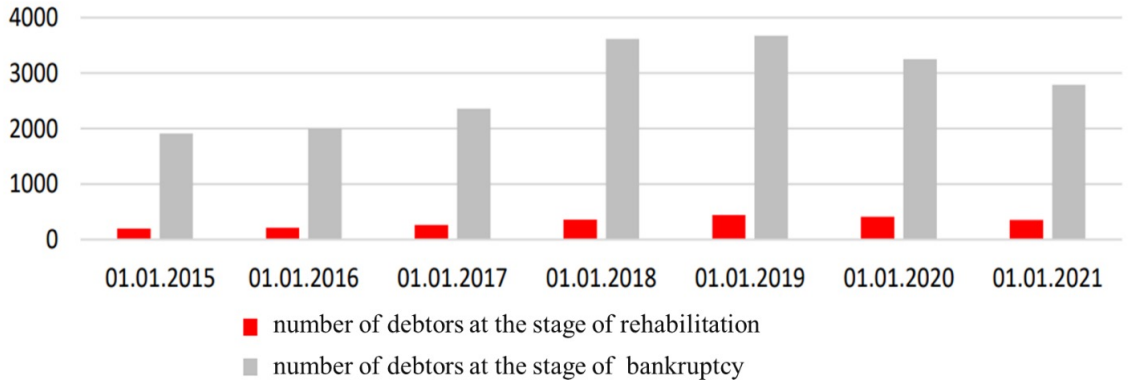

Figure 3. Data on the number of debtors at the stage of rehabilitation or bankruptcy in 2015-2020, the Republic of Kazakhstan
Source: Bank of the Republic of Kazakhstan

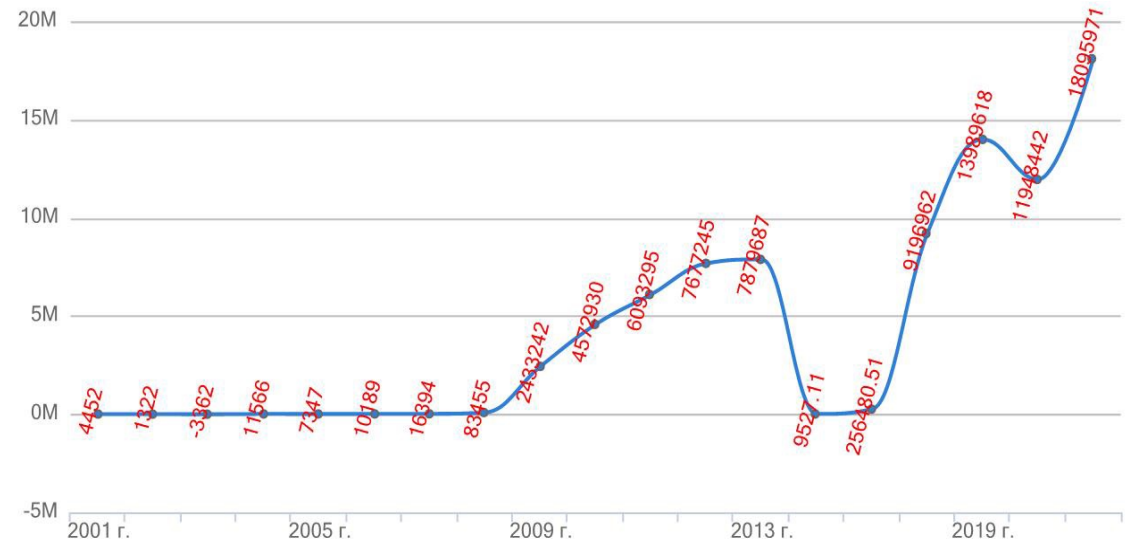

Figure 4. Gross profit from the sale of agricultural products in the Republic of Kazakhstan
Source: Bank of the Republic of Kazakhstan

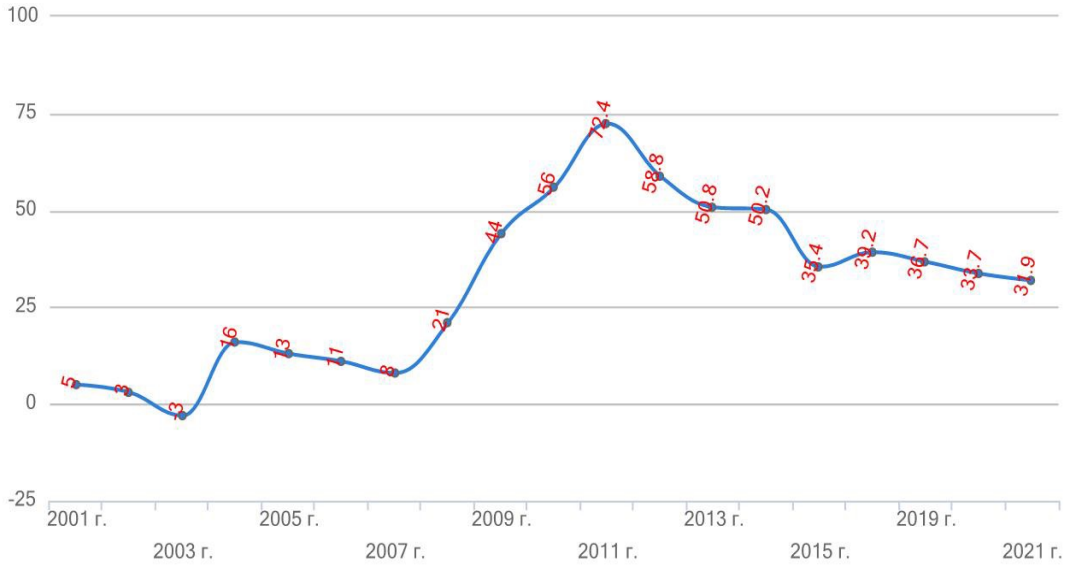

Figure 5. The level of profitability (loss-making) of agricultural production in the Republic of Kazakhstan
Source: Bank of the Republic of Kazakhstan

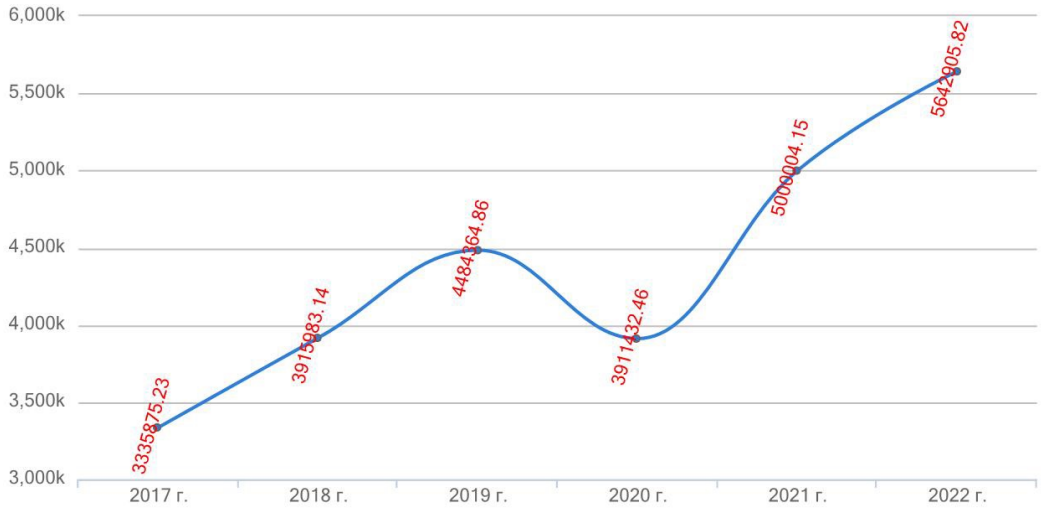

Figure 6. Income from transport activities in the Republic of Kazakhstan
Source: Bank of the Republic of Kazakhstan

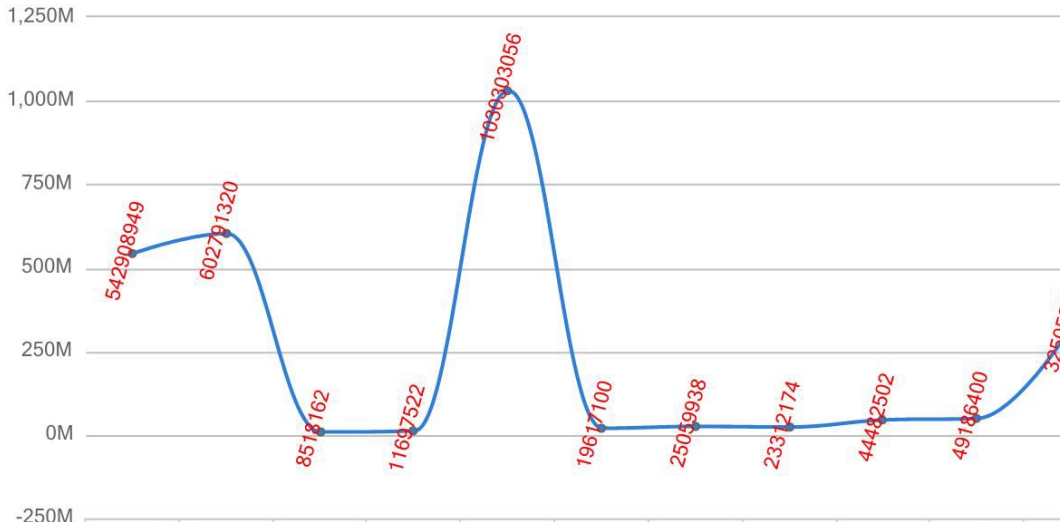

Figure 7. Gross output of goods and services in tourism industries of the Republic of Kazakhstan
Source: Bank of the Republic of Kazakhstan

Nevertheless, modern issues of ensuring domestic commercial organisations financial stability are as follows:

1. A decrease in business investment attractiveness. It significantly reduced the inflow of foreign financial capital, including foreign direct investment.

2. Instability of domestic currency exchange rate in the international market. It complicates the process of financial planning, forecasting, and budgeting.

3. Disruption of supply chains in international transport logistics. It makes it difficult to conduct foreign trade activities for the export/import of products, equipment, and raw materials.

4. Decrease in business and investment activity of business entities. Those wait for the recovery of economic growth.

Therefore, the influence of the above trends provides the commercial organisations with a number of problems, including financial ones. Due to the influence of these problems and external factors, solvency decreases and the practical need for developing and making management decisions aimed at overcoming the crisis.

The measures to control the turnover of working capital by creating financial responsibility centers in the organisational structure of the company in order to improve the management system of its working capital. The control of individual components of working capital at the enterprise should include the development of a special verification program with a detailed list of monitoring activities, tasks, and performers responsible for their implementation.

Recommendations for improving the strategy for overcoming the crisis of insolvent organisations consist of 7 stages; each includes a number of actions.

The stages of recommendations for improving the strategy for overcoming the crisis of insolvent organisations are shown in Figure 8.

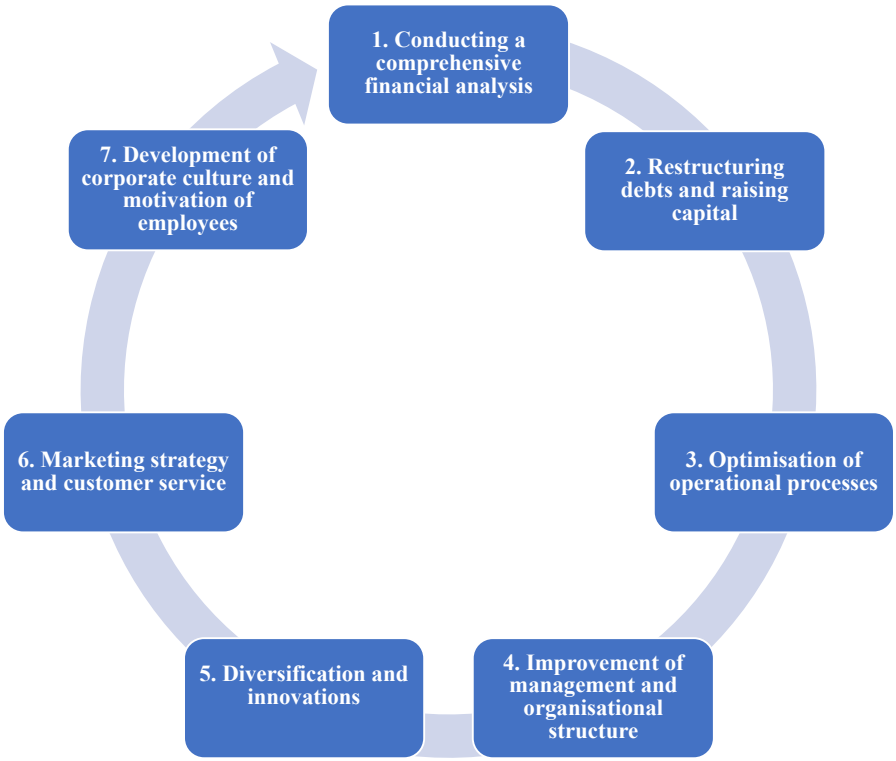

Figure 8. The stages of recommendations for improving the strategy for overcoming the crisis of insolvent organisations

Source: composed by the authors

Each stage of recommendations for improving the strategy for overcoming the crisis of insolvent organisations includes a number of actions. They are shown in Table 1.

Table 1 – Actions at 1-7 stages of recommendations for improving the strategy for overcoming the crisis of insolvent organisations

Stages	Recommendations for improving the strategy
1 Stage	1. Conducting of comprehensive financial analyses
	1.1 Regular audit of the organisation's financial position to identify problem areas and determine key factors affecting solvency
	1.2 Development of early warning system for crisis situations, including key financial indicators
2 Stage	2. Debt restructuring and capital raising
	2.1 Negotiations with creditors to renegotiate debt terms, extending maturities and reducing interest rates
	2.2 Attraction of strategic investors and issuing of new shares to increase the organisation's capital
	2.3 Government subsidies and grants
3 Stage	3. Optimisation of operational processes
	3.1 Analysing of business processes to identify and eliminate inefficient operations reducing operating costs
	3.2 Introduction of modern technologies and automation the processes to increase productivity and reduce costs
	3.3 Reducing of redundant staff and reallocation resources to improve efficiency
4 Stage	4. Improvement of management and organisational structure
	4.1 Establishment of an anti-crisis committee responsible for coordination of anti-crisis measures and operational decision-making
	4.2 Revising the management structure to increase flexibility and adaptability. It ensures faster response to changes in the market environment
	4.3 Introduction of risk management system for threats identification and minimisation
5 Stage	5. Diversification and innovations
	5.1 Conducting of market research to identify new opportunities and segments for business expansion
	5.2 Development and introduction of new products and services to meet current customer needs
	5.3 Strengthening of partnerships and strategic co-operation with other companies to jointly enter new markets
6 Stage	6. Marketing strategy and customer service
	6.1 Reforming of marketing strategy with a focus on digital channels and social media to improve brand promotion
	6.2 Development of loyalty and personalised service programmes to strengthen relationships with customers and attraction of new ones
	6.3 Adaptation of pricing policy to current market conditions for competitiveness improvement
7 Stage	7. Development of corporate culture and employee motivation
	7.1 Introduction of motivation programmes to increase productivity and employee engagement
	7.2 Establishment of positive and innovative corporate culture providing a high level of morality and commitment
	7.3 Investment in staff training and development to improve their competence and adaptability to change

Source: composed by the authors

Conclusion

Therefore, an integrated approach to the development and implementation of strategies to recover insolvent organisations from crisis includes financial recovery, optimisation of operational processes, management reorganisation, reorientation to new markets and products, strengthening marketing activities, and improving corporate culture. Each of these strategies is aimed at stabilising the financial condition, increasing efficiency, and competitiveness.

The implementation of these strategies requires all organisation departments coordinated actions and adaptation to current economic conditions. Hence, as a result of an integrated approach, organisations can overcome the crisis and provide their further sustainable development.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Zhanna R. Ashimova – conceptualization, project administration, writing – original draft.
Svetlana E. Epanchintseva – writing – review & editing.
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Diana Z. Abitova – formal analysis.

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Blockchain and artificial intelligence in intellectual property management

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ORIGINAL ARTICLE

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Abstract. This article discusses the use of blockchain technology and artificial intelligence in the intellectual property management industry. Intellectual property is the result of human activity and an important product for society. Indeed, this product needs copyright protection. Blockchain is an information technology for data transmission and encryption. It is based on a chain of blocks recording the information about all transactions in the system. Artificial intelligence is the property of artificial intelligent systems to perform creative functions. Those traditionally considered the human prerogative. The use of these technologies will contribute to the development of a more convenient intellectual property management system: the use of blockchain and artificial intelligence in the field of intellectual property management is promising, as it greatly facilitates the digital processes; the use of blockchain helps to improve the protection of patent rights and facilitates the monetisation of intellectual property; artificial intelligence and machine learning make routine processes more effective.

Keywords: blockchain; artificial intelligence; intellectual property; machine learning methods; decentralisation; distributed data; information technology; digitalisation

JEL codes: K24, O16

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Introduction

Nowadays, the intellectual property management (IP) industry plays an important role in macro- and microeconomics of regions and state. However, the concept of IP includes the results of human ingenuity, creativity, and scientific activity [1].

Today, the world is in the era of society digitalization. However, not all areas are affected by this concept yet. One of these areas is the intellectual property management industry. Moreover, the process of registering patents, trademarks and technologies is provided by huge amount of paperwork, which significantly complicates it. For example, we can consider the patenting process in the Russian Federation and the EU. The registration of intellectual property in Russia consists of the following stages:

1. Preliminary search. It is a research process establishing compliance with the basic criteria for patenting, namely novelty, inventive step and industrial applicability. During this search, the closest analogues of the registration product are found, followed by a descriptive part specifying the differences between the products. Moreover, patent databases are not always easily accessible.

2. Application formalization. This process involves the preparation of a patent application.

3. Submission of documents to Rospatent.

4. Expertise. Experts are studying the patent application in detail. There are 2 types of examinations: formal and substantive one. The first one examines all documents and the fact of payment of the state fee. The examination is provided in the case of an invention; product analysis for novelty, inventive step and industrial suitability takes place.

5. Confirmation of the patent receipt.

6. Acquisition of a protection document based on examination results.

All these stages can take quite a lot of time.

In general, the registration system in the European Union is similar to the Russian one. However, it is necessary to determine the place of registration there.

Therefore, the registration of intellectual property is followed by a huge number of bureaucratic formalities and inconveniences. It significantly slows down patenting and cause great discomfort. Among other things, not all applications can be considered and processed.

Indeed, the development of 3D printing and artificial intelligence is a threat to copyright holders, since they can easily reproduce existing intellectual property objects.

Therefore, traditional systems no longer fully cope with the legal protection of intellectual property objects and do not ensure their effective use [2]. Hence, it is necessary to modernise the intellectual property management industry with new technologies, one of which may be blockchain technology.

Blockchain is an information technology for data transmission and encryption. It is based on a chain of blocks recording the information about all transactions in the system. Each block in this chain has its own hash amount and the hash amount of the previous block, which allows ones to guarantee data transparency; when one block is changed, its hash amount changes and it will have to be changed in the following blocks, which in turn will change their hash amount. The concept of blockchain is not new. However, a protocol similar to it was first published in 1982 by David Chaum, but its full appearance was presented by Satoshi Nakamoto in 2008.

The purpose of this study is to analyse the possibilities of integrating blockchain technologies and artificial intelligence into the intellectual property management system to increase its efficiency, reduce bureaucratic processes, and improve the protection of intellectual property rights.

This issue is considered in the following works:

1. For instance, Chandratre, A. & Pathak, A. (2021) in the paper Blockchain Based Intellectual Property Management in SSRN Electronic Journal suggest use blockchain technology as an intellectual property (IP) registry to ensure the reliability and transparency of the IP management process. The authors describe a theoretical framework for creating a smart contract allowing storage of IP in encrypted form and present them as digital certificates of authenticity [5].

2. However, Asghar, M. Z., Egaji, R. M. & Griffiths, M. (2023) in the paper The Role of Blockchain in Intellectual Property Management in International Journal of Engineering Research & Technology consider the role of blockchain technology in intellectual property management. They discuss the way blockchain is changing the information storing and processing; consider its potential application in intellectual property management [6].

3. Moreover, Bonnet, M. & Teuteberg, F. (2023) in the paper Blockchain for Managing Intellectual Property: A Multiple Case Analysis in Journal of Information Science and Engineering analyse several cases of using blockchain for intellectual property management. The authors explore various business projects using blockchain to create, protect, manage, and monetise intellectual property [8].

4. Furthermore, Bonnet, M. & Teuteberg, F. (2023) in the paper Blockchain Technology for Intellectual Property Management: A Systematic Literature Review using PESTEL Framework in International Journal of Computer Applications present another systematic review of the literature, but using the PESTEL framework to explore the advantages and limitations of blockchain technology in intellectual property management [7].

5. For instance, Sekerin, A. (2021) in the paper Blockchain for Security Enhancement in Additive Manufacturing Intellectual Property Management in International Journal of Advanced Manufacturing Technology analyses the possibilities of using blockchain to improve the security management and protection of intellectual property rights in the field of additive manufacturing. The author proposes the development of a blockchain-based digital platform for file sharing and describes three main steps for its establishing [9].

6. Futhermore, Gurkaynak, G. & Yilmaz, C. (2018) in the paper The Use of Blockchain Technology in Intellectual Property Management: A Literature Review in Journal of Intellectual Property Law &

Practice consider the literature on the legal and practical aspects of using blockchain in intellectual property management. The authors discuss the prospects of using blockchain in registration, management, and protection of intellectual property rights [10].

Main part

Blockchain technology has certain advantages in the management of intellectual property. These include: data transparency and immutability, their secure storage and transfer, improved rights management system, reduction of bureaucracy and costs, global access and new models of patent monetisation.

Data transparency is a feature concerning all transactions and data recorded in the blockchain and accessible to all users or network participants. However, centralised data warehouses contain and manage only one organisation information. Transparency is based on a chain of transactions. This system allows the user to see the transaction history without the intervention of centralised authorities or third parties. It also can be perfectly used in the intellectual property management industry, as it provides easy and quick access to patterns and their owners in court proceedings.

The immutability of data in the blockchain is based on impossibility of information editing and deleting without the consent of network participants. It is possible through the use of cryptographic methods. They guarantee data immutability and authenticity. They include: hashing – the process of converting input data of arbitrary length into a fixed set of fixed-length data; digital signatures – they allow network participants to verify legal establishing of transactions and blocks; smart contracts – are software tools specifying the necessary conditions for a transaction. Therefore, the blockchain ensures the preservation of intellectual property rights and can be used for other tasks in this area.

The improved rights management system allows ones to significantly reduce the monetary and time costs during patent registration, ensure a higher level of patent security, and simplify the monetisation of patents. It can be implemented using smart contracts. They can automate the process of receiving remuneration for copyright holders or regulate access to content. Hence, a scientific article, an educational video, or other content on the Internet can be accessible to other people only after making a certain payment [3].

Indeed, blockchain is a global technology capable to provide remote access to patents for people from different countries. It can ensure more extensive protection of intellectual property rights.

New monetisation models imply the possibility of creating tokens certifying intellectual property rights [2]. This feature allows ones to share and sell IP rights. On the one hand, it provides the opportunity for crowdfunding, as funds will proceed directly from investors to copyright holders. On the other hand, smart contracts can be used to make micropayments for the use of a patent.

Table 1 – Top 10 Blockchain and TPP Technologies

Place	Technology	Effects	Significance index
1	Non-Fungible Tokens (NFT)	Uniqueness	1
2	Crypto Assets	Safety	0.89
3	Decentralised applications	Efficiency and transparency	0.42
4	Smart contracts	Safety	0.28
5	Distributed Hash tables	Safety	0.20
6	Digital tokens	Uniqueness	0.17
7	Tokenised assets	Uniqueness	0.15
8	Smart property	Safety	0.12
9	Decentralised Autonomous Organisation (DAO)	Efficiency and transparency	0.11
10	Open Source Blockchain Platforms	Efficiency and transparency	0.03

Source: FINAM[1]

[1] *TFINAM. URL: https://www.finam.ru/publications/item/top-10-blokcheyn-tekhnologiy-20230705-1254/ (Accessed 01.02.2024).*

Smart contracts (No. 4) provide security by automating the execution of contracts without the presence of intermediaries. It reduces the risk of fraud and increases transactions reliability. Digital tokens (No.6) contribute to uniqueness by presenting assets digitally. It simplifies their transfer, trading, and reduces management costs. Decentralised Autonomous Organisations (DAO) (No. 9) increase the efficiency and transparency of management by allowing organisations to function without central leadership and use smart contracts to automate processes. Open source blockchain platforms (No. 10) ensure efficiency and transparency, facilitating the development and implementation of blockchain technologies through open access to source code and opportunities for teamwork[2].

Table 2 – Top 10 Blockchain and TPP Technologies

Rank	Technology	Effects	Significance index
1	Supply chain and logistics monitoring systems	Transport and logistics	1.00
2	NFT applications	Creative industries	0.83
3	IoT applications with data management decentralisation	Trade, communications and data transmission	0.75
4	Digital platforms for real estate transactions	Real estate transactions	0.62
5	Electronic voting system	Communications and data transmission	0.61
6	Anti-money laundering systems	Finance	0.53
7	Tokenised assets	Uniqueness	0.15
8	Smart property	Safety	0.12
9	Decentralised Autonomous Organisation (DAO)	Efficiency and transparency	0.11
10	Open Source Blockchain Platforms	Efficiency and transparency	0.03

Source: FINAM[3]

Smart contracts ensure new opportunities for monetisation of creative products. These technologies enable the management of digital contracts and copyrights, effectively controlling access and preventing unauthorised distribution of digital content. They also prevent apiracy and ensure accurate royalty payments. In the next 3-5 years these systems are expected to be widely implemented in the creative industries, including the media and entertainment ones. This will significantly increase intellectual property protection and optimise content management processes, making them more transparent and reliable[4].

Examples of using blockchain for patent management:

Blockstack. It offers decentralised data and application repositories using blockchain technologies. The main idea is to give users control over their data by removing intermediaries and centralised servers. Users can store their data on their own devices or choose trusted storage sites. It increases user security and privacy. The platform also provides tools for developing decentralised applications operating on top of this network.

Chronicled. It uses blockchain to register and track medical products. Using unique identifiers based on the blockchain, they create a digital footprint for each drug lifecycle. It allows ones to effectively combat the falsification of medicines and ensure control over their quality and authenticity.

Ujo Music and Mycelia. These projects use blockchain to transform the music industry. They offer transparent payment and rights management systems for musical works, allowing artists to receive fair compensation for their creative work. Thanks to the blockchain, participants in the music ecosystem can

[2] *FINAM. URL: https://www.finam.ru/publications/item/top-10-blokcheyn-tekhnologiy-20230705-1254/ (Accessed 01.02.2024).*
[3] *TFINAM. URL: https://www.finam.ru/publications/item/top-10-blokcheyn-tekhnologiy-20230705-1254/ (Accessed 01.02.2024).*
[4] *TFINAM. URL: https://www.finam.ru/publications/item/top-10-blokcheyn-tekhnologiy-20230705-1254/ (Accessed 01.02.2024).*

trace every stage of the use and monetisation of their works. It eliminates the problems of unfair income distribution and lack of transparency.

Guardtime. It offers solutions to protect digital assets, including movies and television programs through using blockchain technology. They help organisations to ensure the security and integrity of content by preventing unauthorised access and distribution. Thanks to the blockchain, it is possible to create a transparent digital footprint for each content object. It provides reliable protection against cyber threats and piracy[5].

Artificial Intelligence. It can be an excellent tool for establishing an intellectual property management system based on blockchain technology. However, there is a routine task to search for similar IP products in the registry. Therefore, AI can be used to automate it in case of formalized patents. We believe, the method of extracting information from the text (IE) documents can be used [4].

Machine learning methods (MLT). They contain clustering (uncontrolled MLT) and classification (controlled MLT) used for text mining. Therefore, clustering can be used to analyse existing patents. This technique will be effective one as follows: the key functions of patent documents are defined on the basis of different IP objects. Therefore, the analysis is provided in 2 stages: data preparation and analysis itself.

Artificial intelligence can help determine the value of intellectual property and enter this information into smart contracts for their further use. It will help automate the process of IP monetisation. The applied machine learning methods include:

1. Regression models

– Linear regression is one of the simplest MLT methods used to analyse dependencies and predict values. Within the framework of intellectual property, it is able to determine the relationship between value and various factors affecting it. The factors include: the number of patent citations, the age of the patent, the number of applications and legal protection.

– Multiple linear regression is an extension of linear regression. It is used to model the relationship between one dependent variable and two or more independent variables.

– Polynomial regression is a generalisation of linear regression. It is used to model nonlinear dependencies between a dependent variable and one or more independent variables.

2. Neural networks

– Multilayer perceptrons (MLPs) are one of the most popular types of artificial neural networks. They are used to solve a wide range of tasks, including estimating the value of intellectual property (IP). MLPs are able to model complex nonlinear dependencies between variables. It makes them especially useful for forecasting and analysing the cost of IP. MLPs consist of several layers of neurons: an input layer, one or more hidden layers, and an output layer. Each neuron in the layer is connected to the neurons of the previous and next layers through weights adjusted during the learning process.

– Recurrent neural networks (RNNs) are a type of artificial neural networks. They are used to process sequential data and simulate time dependencies. In the field of intellectual property (IP) management, RNNs can be applied to predict the value of IP based on time series of data, such as the dynamics of patent citations or changes in market indicators. RNNs differ from traditional neural networks. They have recurrent connections that allow ones to take into account previous network states when processing current input. This makes RNNs especially effective for tasks concerning the order and temporal sequence of data.

Another possibility for integrating AI and machine learning methods may be the automatic generation of patent applications. The main principles of this process will be: collection and analysis of source data, structuring and creation of the application text, and verification of compliance with established standards. We can distinguish the following:

– Natural Language Processing (NLP). This method specialises in the interaction between a computer and a human language.

– LSTM (Long Short-Term Memory). It process long sequences of text and remember important

[5] *RBS. URL: https://rbs.partners/mediatsentr/blokcheyn-i-zaschita-intellektualnoy-sobstvennosti-statya-sevil-baer-v-it-speaker (Accessed 01.02.2024).*

information in their memory cells.

– GRU (Gated Recurrent Unit). It is a simplified version of LSTM; it requires accounting for long sequences.

These ways of artificial intelligence interaction will help in the implementation of intellectual property management. However, blockchain and artificial intelligence technologies have potential risks and disadvantages.

The disadvantages are as follows:

1. Privacy and data privacy issues

– Leakage of confidential information. This problem is based on blockchain transparency principle: any network participant, in the absence of proper encryption and data protection, can gain access to confidential information.

– Violation of property rights. Despite the continuity and authenticity of the data provided by blockchain technology, it can also cause disputes about intellectual property rights in case of incorrect interpretation of data.

– Intellectual property theft. One of the options for such an outcome may be the lack of proper security. It will not be able to prevent attackers from gaining access to valuable patents. However, smart contracts controlling IP in the blockchain can be hacked. It can cause illegal transfer or data modification. Moreover, phishing and social engineering allow attackers to access to private keys and further data hacking.

2. Technical failures and vulnerabilities can pose serious risks to intellectual property management. They are as follows:

– Blockchain network failures. Insufficient scalability and performance issues can affect the stability of the blockchain and cause delays and disruptions in its operation. It can cause temporary data unavailability or delayed transaction processing.

– Smart Contract Security issues. Smart contracts are exposed to the risk of software errors. Significant consequences can arise in case they are misspelled; among them damage to intellectual property or leakage of confidential information.

– 51% attacks. 51% attacks are considered as a threat to decentralised blockchains. The attackers gain control over more than half of the network's computing power. it can cause data manipulation and transaction substitution.

3. Insufficient accuracy of artificial intelligence

– Incorrect conclusions or decisions. Artificial intelligence, especially in the initial stages of development, can make mistakes in data analysis or in the decision-making process.

– Errors in decision-making processes. Insufficient accuracy of artificial intelligence algorithms and models can cause errors in decision-making.

4. Issues of responsibility and ethics

– Problems with determining responsibility for automated solutions. The use of artificial intelligence in intellectual property management processes can create difficulties in determining responsibility for errors or problems in terms of automated systems.

– Ethical aspects of the use of artificial intelligence. Ethical issues arise when using artificial intelligence, such as transparency of algorithms, protection of data privacy and fairness in decision-making. They may affect the management of intellectual property.

5. Insufficient regulation and legislative framework

– Absence of clear legal norms. Nowadays, legislation in the field of artificial intelligence, and especially its application in the field of intellectual property management, is rather underdeveloped, and the previous laws can not be considered for new conditions.

– Uncertainty of legislative norms. Currently, the poor legal regulation in the field of new technologies, in particular blockchain and artificial intelligence, may be an obstacle to the widespread dissemination of these technologies in the field of intellectual property management.

Conclusions

The conducted research of blockchain and artificial intelligence in the management of intellectual property use allows us to conclude the following:

1. The use of blockchain and artificial intelligence in the field of intellectual property management is promising, as it greatly facilitates the digital processes.

2. The use of blockchain helps to improve the protection of patent rights and facilitates the monetisation of intellectual property.

3. Artificial intelligence and machine learning make routine processes more effective.

4. Hence, the technologies discussed in this article have a huge impact on the field of intellectual property management, create new opportunities, and allowing patenting to be globalised.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Sergey N. Kosnikov – conceptualization, project administration, writing – original draft.
Vladislav A. Ivannikov – formal analysis; investigation.

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Political economy assessment of the educational system promotion in Russia in the conditions of digital economy formation

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ORIGINAL ARTICLE

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Abstract. The article reviews a political-economic analysis of the growing dynamics of the education system in Russia, using the example of higher education in the creative solutions of the digital economy. The author examines the economics of education from the political economy view. The evolution of targets in higher education is presented. When comparing definitions of higher education targets, they provide two mutually related, but competing functions of higher school: the role of higher education in the teaching workforce for all economic sectors and the general intellectual growing of a creative, socialized personality. The nature of economic interests in the higher education system is determined. Market economy and democratic society principles imply models of competitive harmony in economic interests of higher education. The educational product is analyzed from the principle of diglossia as a public and private benefit. In the near future, a combination of fee and free higher education in Russia is inevitable. However, the share of fee-paying educational services of universities will dramatically increase. The analysis confirms academic steps to create a scientific product in the digital economy. Competition of universities in the market of scientific products for receiving profitable contracts with firms and corporations stimulates universities to increase their rankings. The conclusion shows the inconsistency of the dynamics of the development of the education system of Russia in the digital economy. An important contradiction is in the prevalence of political decisions free from long-term socio-economic consequences.

Keywords: digital economy; economic interests in higher education system; education economics; higher school; political economy; Russian education system

JEL codes: K24, O16

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Introduction

In economic research of education in general and higher education, in particular, we note [1] several related issues and challenging problems. One of them covers everything that represents the economics of education as one of the economies' sectors. These include issues of financing, taxation, economic costs of the educational process, organization of wages, demand for educational services of different levels and quality, the functioning of the market for implied services, the role of the state in its regulation, schemes for managing educational institutions and appropriate legal support. It is this range of questions that constitutes the content of many monographs and textbooks [2, 3]. And the subject of the economics of education is usually determined in such a way that issues are limited by this approach: «The subject of the economics of education is the driving laws of material, financial, labor resources led to the field of education or used in it to achieve socially and personally determined goals of its functioning and development «[4, p.382].

This definition of the subject of the economics of education clearly reflects the prevailing view on research concentration around the «driving laws of material, financial, labor resources», and «socially and personally determined goals of functioning and development» is something external, exogenous with respect

to the movement of resources in education [5].

Moreover, in the literature there are other definitions of the subject. So A. Maloletko [6, p. 18] notes: «In the economics of the system of higher and postgraduate professional education we see the overall material, technical, financial, labor resources and potential in various organizations».

Despite the evidence in the importance and productivity of studying the mechanisms of economic resources movement in the field of education, it is impossible to ignore other challenges in the economics of education.

Methods

The title of this paper associates with the necessity to analyze statistical indicators characterizing changes in the quality of educational organizations for some period, the number of students and teachers, their scholarships and salaries, the ratio of organizational and legal forms, etc. However, statistical analysis is not the subject of this work. The authors intend to focus on political economy analysis of the education system promotion. We talk about the role and functioning of the education system in general, and higher education in particular, in the socio-economic tenor of the country, the growth of human capital and intellectual potential in the conditions of digital economy. About the special properties of the product of production in the field of education as a public and private good, about a complex system of economic relations in which a higher educational institution operates. We study contradictions, compromises, harmony of economic interests, manifested in higher education, on the ratio of goals in the long- and short-term runs. The significance of a strategic approach to planning the development of higher education and the management of this elaboration – all that goes beyond the sector economy, and which may be called the political economy of higher education [7]. Within the framework of the study, we use methods of analysis, synthesis, modeling, a method of scientific abstraction, a systematic approach to analysis, analogies, comparisons, categorizations.

Results

The framework of the article uncovers any political economic issues of higher education, therefore, we will single out only a few, as we see it, especially relevant and deserving priority issues.

1. The objectives of higher education in the formation of the digital economy

The definition of targets is a crucial starting point in shaping the concepts of higher education development. Few people, apart from universities, are able to foresee socio-economic changes, and in fact their mission includes both adaptation to these changes (for example, the desire of technical universities to develop humanitarian areas with appropriate connivance of the Ministry, which has administrative rent from this process), and foreseeing the impact on these changes [8, 9].

The political and economic assessment of the changes in the field of higher education in the conditions of the digital economy suggests that the government has formed an opinion about higher education as a subsidiary. Its existence is justified only from the point that it contributes to the functioning of labor markets. Universities must shape the skills required by potential employers. The effectiveness of universities is estimated by how quickly graduates find a job. Hence the conclusion-recommendation to subsidize the employment of qualified holders of diplomas, and not to spend money on training low-quality specialists [10].

National concepts of higher education vary across countries. To a large extent, such differences are associated with different participation of the state budget in financing higher education [11-13]. Different participation is determined by the targets for higher education results.

In our previous published papers [14], we identify four main approaches to the goal setting of higher education.

The first is the orientation of the higher educational institution to the training of highly qualified professional personnel with a clearly marked specialization for further work in battle or another sector of the economy in a particular specialty. With such a definition of the goals of higher education, attention is focused on special disciplines and professional knowledge and experience.

However, as the characteristics of a post-industrial society matured and the digital economy had a go,

the lifelong or almost lifelong attachment of a person to a particular profession conflicted with new socio-economic conditions. First, the increasing variability of the structure of production and economic relations is increasingly raising the role of post-professional education, which allows a person to change the specialization and nature of his activities. Second, narrow professional specialization is fraught with the danger of limiting the horizons of the socio¬economic world outlook. And it is not by chance that in recent years the expansion of humanity education in highly specialized higher educational institutions, which train, for example, doctors, engineers, and geologists, has an urgent demand. Third, a narrow professional specialization limits freedom of choice, increases a person's dependence on the state of the industry and on the behavior of the employer, that is, limits the freedom of the individual as a whole.

The second approach to defining the goals of higher education and to developing its concept is the opposite of the first. Targets are shifted from specific training to the development of human intellectual, creative potentialities. It is this that makes it relatively easy to move from one type of activity to another, to acquire new information and new special professional knowledge and skills. This approach has become prevalent in the top-rated universities in the world. With the described approach to defining the goals of higher education and developing its concept, the tasks of intellectualization, enhancement of the creative potential of a significant part of the country's population and the formation of its intellectual elite are much more successful.

The third approach: with a view to higher education, the problems of young people's differentiation in terms of intellectual development coefficient and the ability to assimilate and use increasingly complex information come to the fore. The method involves a series of exams, during which an examination threshold is found for the subject.

The fourth approach is the opposite of the third: no exams, diplomas, or degrees are needed. The student is studying at the university disciplines of his own choice. Whether useful or not for his future career, that is the problem of his personal choice and understanding of his capabilities. With all the seeming exoticism of such target-setting, there are already quite a few universities in the world that build the learning process on such principles.

2. Economic interests in higher education

The market exists not only for graduates, but also for other products of higher education, including professional opportunities in the universities themselves.

The situation in the education in Russia is characterized by the continuous reorganization of the Ministry of Education and Science. An analysis of this situation using the method known as the Saaty AHP suggests that the government wants to retain the main (if not decisive) role in determining the parameters of functioning of higher education. This method, used in the process of creating an analytical hierarchy and developed by Thomas L. Saaty [15], is a planning and decision-making method in the process of multi-criteria decision (there is an evidence using this method in the USA in 1985-2000). The purpose of the method is to set, through a series of steps, a hierarchy of scenarios that should or can lead to the large-scale of a specific goal. In a scenario involving evaluation processes, the influence or significance of individual parties and sub-goals is also measured. The work ends with the construction of a script inscribed in a hierarchical framework with a dimension with its own vector.

The impulse of transformations coming from the government is highly-likely to correlate with the influence of market mechanisms (current economic interest) than with concern about the quality of education (long-term economic interest due to the fact that education has such a characteristic as hereditarily).

In a number of works, researchers note that the mechanism for the realization of national economic interests is complex and multi-dimensional. The state calls to advocate their interest in determining long-term and short-term state interests, including concepts and programs for the development of higher education [16, 17].

State interests are realized through power and administrative structures, through the activities of people working in these structures, and civil servants. In moving along these steps, national economic interests are subject to deformations to a greater or lesser extent.

First, state interests are far from matching with national ones. This circumstance is analyzed in detail by the theory of public choice (D. Buchanan) [18], which is famous as the new political economy.

In our opinion, a broader and more precise definition of the subject of new political economy is presented in publications in the pages of the journals «Problems of New Political Economy» and «Issues of Political Economy», as well as in [19].

Secondly, departmental interests, competitive opposition of various departments arise within the management structures. Under certain conditions, departmental interests are able to replace and push into the background national interests. Thirdly, in the activities of individuals of public servants, national and state interests are combined with personal economic and personnel interests. And the point here is not only in behavior oriented towards the granting of status rents, but also in the fact that the effect of the realization of long-term economic interests often turns out to be beyond the time limits of the terms of office and responsibility of individuals, civil servants. State interests do not always correspond with the economic interests of universities and with the interests of professors and teachers.

The choice of school and specialty of higher education is poorly associated with the real needs of the economy. Despite, for example, the signals of the market about the overproduction of economists and lawyers, these specializations occupy a priority place in the applicants' choice. And after graduating from university, graduates still find jobs that are acceptable to themselves, although they do not quite coincide with the specialization obtained (another argument in favor of the second approach discussed above to the definition of goals and the concept of higher education) [20].

Another issue is burning: the uneven distribution of the intellectual, educational and informational potential throughout the country. Schools and hospitals, cultural institutions in remote places and especially in rural areas do not receive an influx of young teachers, doctors, cultural workers. The temptation of a simple solution is great: the activation of an administrative resource. They are implementing the proposal to solve the problem by reviving targeted admission to higher educational institutions and distributing graduates. But it is necessary to take into account social costs. They consist, firstly, in restricting the democratic right of any citizen to receive higher education and to follow up on their own, free choice. Secondly, work in the direction will become a predominantly for young people from poor families, which will reinforce the stratification of the population, socio¬economic inequality.

It is necessary to recognize the weakness of institutionalization of competition of universities for obtaining limits on budget financing and for attracting applicants on a budgetary and extrabudgetary basis. Determining the number of students admitted to a university with budget funding, without sufficient and publicly known criteria in competition, translates the solution of the problem into the plane of the relationship between negotiating power and personal informal relationships with employees of the Ministry of Education and Science of the Russian Federation. Institutionalization of inter-university competition and the development of a system of objective criteria in the competition of universities for admission numbers financed from the budget not only makes it possible to limit the space for decisions of an informal and shadow nature, but also contributes to improving the quality of work of universities stimulated by competitive conditions [21].

3. Educational product as a public and private benefit

Public goods, as well known, have two characteristic features: they are noncompetitive and non-exclusive. These characteristics apply to university educational products with very significant limitations. Noncompetitiveness means zero marginal cost. If adding the student audience with each additional student did not increase university costs, there would be a non-competitiveness. In reality, the increase in the number of students for each additional unit is still associated with an increase in a certain proportion of costs. This is the burden on the teacher in all forms of individual communication with students, the area of audiences, equipment with computers, other teaching and material means, etc. So the concept of non- competitiveness is only very limited to the educational product of the university [21].

Equally limited is another characteristic of the public good in relation to the educational product of the university – non-exclusivity. A product is non¬exclusive, if no one can be excluded from the scope of its consumption. If anyone had free access to a university education, the non-exclusivity of this product

would indeed be asserted. In reality, not all young people can become students: admission to budget places is limited by funding, there are applicants' contests, access to higher education for a fee. So the concept of non-exclusivity in relation to the system of higher education remains only within the limits of equality of opportunities and rights in competition for obtaining educational products of universities.

Thus, an educational product, having very limited properties of a public good, is mainly a private good. The social significance of higher education is not determined by the properties of the public good, but by exceptionally large positive externalities. Higher education, firstly, meets the needs of firms, the economy and culture of the country as a whole in highly qualified personnel, ensures the growth of intellectual potential, and secondly, the formation of a socially active, responsible population, high-quality society, and civil society. That is, the most fundamental national economic interests are served and realized. Yes, and within the micro-social neighborhood, communication with highly educated people is comfortable for others.

The prevalence of the properties of private good argues the fee for higher education. In most economically de\'eloped countries, it is [22-25]. However, this problem is far from clear, especially in the conditions of modern Russia. First, the payment for higher education is objectively perceived by society as a departure fi-ora the usual social achievement, as a deterioration of living conditions. Secondly, the payment of higher education can limit access to it by young people from low-income families, who constitute a very large part of the population so far. Consequently, the conditions for social and economic inequality are reproduced, it even increases. In detail, this thesis is developed in the works of N.G. Yakovleva [26]. Thirdly, as it is quite clearly stated in economic theory, market mechanisms themselves, without additional regulatory influence from the state, can not sufficiently direct resources to the production of goods with large positive externalities, including in the higher education.

Funding higher education will be partly earned out by entrepreneurs and charitable foundations. This perspective is closely linked with the trend of increasing autonomy of universities and the conditions for a significant increase in the salaries of professors and teachers, and the improvement of teaching and material support.

4. Scientific product of universities in the frame of digital economy

Together with the prospects and trends discussed above, new trends are also emerging in Russia. It is about turning universities into scientific and information centers with their research laboratories, not only enriching science with new discoveries, but also providing efficient, new and improved technologies to the economy. This aspect of university activities requires special attention. In Russia, for decades, the division of scientific work has been. Fundamental theoretical research was carried out by academic research institutes. Applied scientific research was carried out mainly by industry research institutes (research institutes and design bureaus). And universities and colleges were mainly engaged in the training of highly qualified personnel, the translation of scientific knowledge to the student audience. And although in recent years, attention to universities' own research activities has increased, it still remains in the background as compared with the educational process, which is still to a small extent connected with the scientific research of the professors and students themselves.

World practice is moving in a different direction. Universities have become the main medium of scientific and technological progress. Moreover, in the concept of a post-industrial society there are three stages of development. And if in an agrarian society the church and the army were a specific form of social organization, and corporations in the industrial society, in a postindustrial society this role is assigned to universities. Universities are turning into centers of scientific, informational, economic, and cultural life of the country that are system-organizing society.

At the same time, the content of the scientific product of universities has fundamentally changed. The distinction between fundamental and applied research in various institutes remains in the past. In most cases, the university is directly focused on the needs of the economy in the field of technology. Applied science, drawing on ideas from fundamental research, has become the main field for the realization of the research potential of universities. Direct relations with corporations, the sale of the scientific product of the university, the fulfillment of orders for the development of new technologies, the implementation of joint scientific and

technical programs and projects with the business – all this causes fundamental changes in the sources of income of universities, in financing their activities.

These processes fundamentally change the methodology of higher education. The participation of students in research and development demanded by economics and business, with their focus on significant applied results, contributes to the formation of highly qualified specialists ready for effective practical work. Often, since the student time, cooperation with certain firms has been established.

Discussion

A political-economic analysis of the dynamics of the promotion of the education system of Russia on the example of higher education in the conditions of the digital economy gives the interpretation of the content of the economy of higher education from the position of political economy. The tendency of universities to turn into system-organizing centers of economic and social life is very important for determining the place and role of a university in each given region. This interesting and actual problem is already to a large extent considered in our publications [1]. Universities are socio-economic institutions (in terms of institutional ism) that are not clearly defined. This thesis is unequivocally criticized from the standpoint of the history of the emergence and development of universities. But in Russia in the early twenty-first century, it acquires a special form. The education system in Russia suffers from many shortcomings, the most significant of which is organizational and financial inefficiency. Many universities are called universities, although in fact they do not even have advanced research programs [27, 28].

According to the previously stated position [7], the intellectual potential of the population, its level of professionalism and education, the development of science, technology and culture are an external resource of socio-economic development. The multiplication and effective use of this resource is the main condition for economic growth, improving the welfare of the people, promoting freedom and democracy, forming a civil society, ensuring social and political stability in the country, occupying a worthy place in the global economy and international relations, that is, in aggregate, and solving the most important problems of modern Russia.

Conclusions

Summing up our political and economical ideas about the development of the Russian education system on the example of higher education in the conditions of the digital economy, we emphasize that current trends are very contradictory. but the main one, unfortunately, is the prevalence of political decisions without taking into account long-term socio-economic consequences.

When comparing approaches to the definition of higher education goals, essentially two mutually related, but competing functions of higher school are found. This is the role of higher education in preparing qualification personnel for all sectors of the economy, on the one hand, and general intellectual development, the formation of a creative, socialized personality [26]. Finding the optimal combination of these two goals is related to the specifics of the economic relations in which the university operates, with a compromise resolution of the contradictions of economic interests in the higher education system. In other words, we have a problem of a political economy nature.

Corresponding to a market economy and democratic organization of society, are models built on market principles based on these principles, providing for a compromise harmonization of economic interests. The core of such models can be contracts providing for additional, scholarship student support and obligations relating to housing and other living conditions of the young specialist. Another important aspect is related to the economic interests of each individual university, as well as the personal interests of the professors and teachers working in it.

The predominance of the properties of the private good of the educational product of universities argues paid for higher education. For the foreseeable future, a combination of payment and free higher education in Russia is inevitable. However, the prospect looks in such a way that the share of payment for educational services will consistently increase.

Competition of universities in the market of scientific products for the receipt of the most profitable orders and the conclusion of contracts with firms and corporations stimulates universities to increase their ranking.

What matters is not whether the capital is a university or a provincial, but the scientific potential, image, brand, obtained patents for discoveries and inventions, scientific publications, the level of informatization of activities, implemented projects and, ultimately, a place in the scientific hierarchy.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Vladimir A. Noskov – conceptualization, project administration, writing – original draft.
Vasiliy V. Chekmarev – formal analysis; writing – review & editing.

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