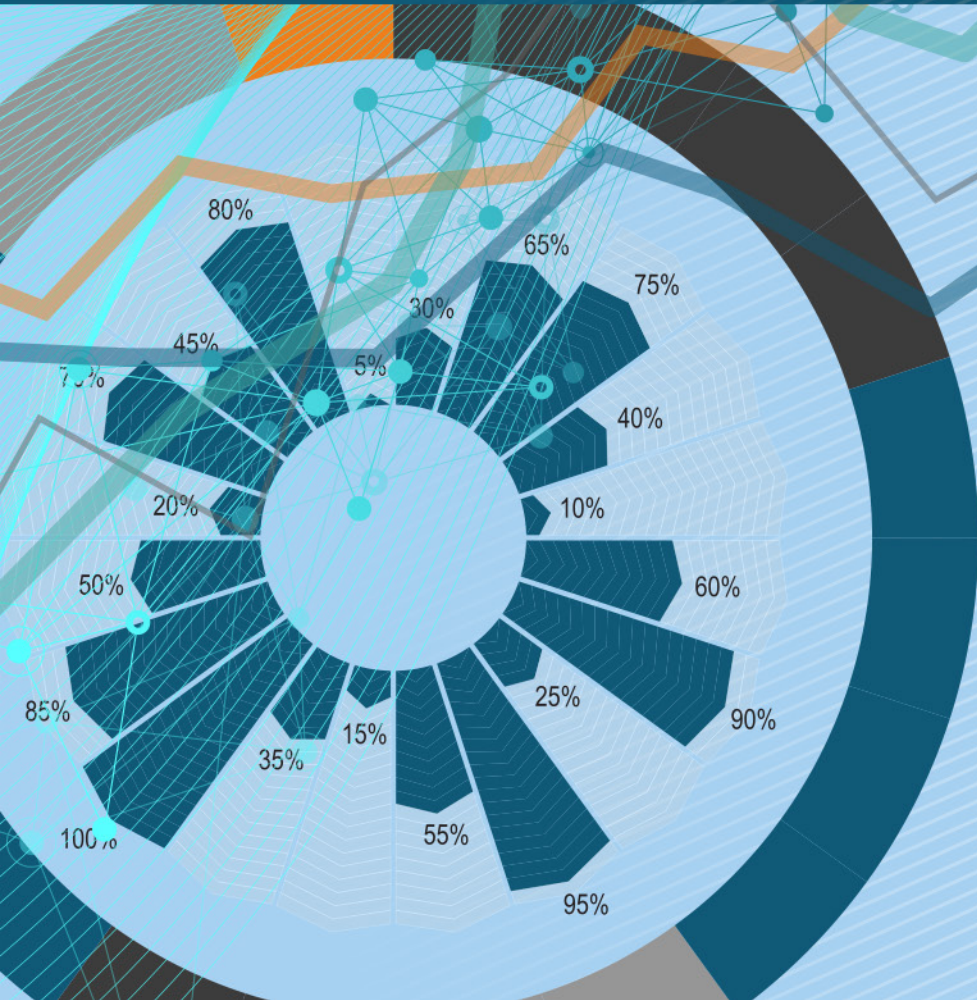# JOURNAL OF REGIONAL AND INTERNATIONAL COMPETITIVENESS

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JOURNAL OF REGIONAL AND INTERNATIONAL COMPETITIVENESS

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Contents

The impact of labour migration on labour productivity in the EAEU countries

ORIGINAL ARTICLE

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Abstract. The fluent labour resources transfer within an integration association affects not only the level of wages or employment, but also causes complicated, complex consequences for the labour donor countries. The purpose of the study is to assess the impact of labour resource spillovers on the level of labour productivity in the EAEU countries. Using correlation analysis, the paper verifies the hypothesis of the reverse spillover effect associated with the return of labour migrants to their home countries. It contributes to labour productivity growth in the EAEU countries. The results show statistically significant (multidirectional) relationship between the variables under study – labour migration affects the level of productivity in the EAEU countries. Indeed, the growth of labour migration positively affects the level of labour productivity in Armenia and Belarus. However, in Kazakhstan and Kyrgyzstan those is negative one. The research results can be used to develop a strategy of socio-economic development of the EAEU countries considering the parameters of external labour migration.

Introduction

The relative freedom of labour mobility within the EAEU has both a direct impact on supply and demand balance in national labour markets and wage dynamics, and an indirect impact through the so-called spillover effects of labour migration. These effects are diverse ones: from the diffusion of knowledge and the accumulation of human capital to the challenges of crosscultural integration and diversity. One of the most controversial aspects of labour migration spillover effects is the impact of labour migration on labour productivity in labour donor countries. In the EAEU these are Belarus, Kazakhstan, Kyrgyzstan, and Armenia. We assumed that migration flows within this integration union are unidirectional ones – the labour force moves to the economy with higher wages, i.e. Russia.

On the one hand, the labour migration can have a positive impact on labour productivity in donor countries. It develops the labour shortages in the labour market resulting in the replacement of expensive labour with technology. Moreover, labour migrants' remittances can contribute to economic development through increased consumption and indirectly affect labour productivity in the donor country. Furthermore, migrants returning to their home country can act as providers of new knowledge and skills, etc.

Nevertheless, it is also necessary to consider the factors negatively affecting the level of labour productivity in the labour donor country. Indeed, the outflow of labour force may have a negative impact on

labour productivity in industries with a high dependence on low-skilled workers. For example, a significant outflow of workers from rural areas could cause labour shortages. It would slow the development of certain industries and reduce overall labour productivity. Moreover, the long-term outflow of young and healthy workers will have a negative impact on demographics, depopulate entire regions, deteriorate infrastructure and quality of life, and reduce the productivity.

The ambiguity of labour migration impact on labour productivity in the donor economy is considered in the economic literature.

According to Panshin, Markhaichuk & Yares (2019), the regression analysis confirmed hypotheses that higher level of labor migration from the region leads to a decrease in labor productivity in the region [1].

Laut, Pranizty & Sugiharti (2023) note, meanwhile, human capital spillover from indicators in-migration has no impact on productivity. These results indicate that knowledge spillover support by quality of human capital, but the movement of labor has not provided positive externalities for the surrounding environment [2].

Marois, Bélanger & Lutz (2020) highlight that high immigration volumes combined with both low education and integration leads to increasing economic dependency [3].

Imbert, Seror, Zhang & Zylberberg (2022) find that, when immigration increases, manufacturing production becomes more labor intensive and productivity declines. They show that rural-urban migration induces both labor-oriented technological change and the adoption of labor-intensive product varieties [4].

According to Calcagnini, Marin & Perugini (2021), migration flows of qualified human capital had a positive impact on total factor productivity (TFP) growth in the regions of destinations, while the number of emigrants have a positive effect on the TFP growth in the regions of origin [5].

Bassie, Sirany & Alemu (2022) based on the discriptive data consider the issue of the majority of respondents used their remittances for consumption, to acquire agricultural inputs, and to pay back their debts and tax payments. According to econometric studies, rural-urban migration has little influence on agricultural productivity. Remittances, cultivated land, livestock ownership, and extension services, on the other hand, have a positive and significant effect on agricultural productivity. In a nutshell, the link between migration, remittances, and agricultural output in agrarian and rural families is remarkable [6].

Antczak (2023) examines the issues of short-term (from one to three years) to labor-donor countries, international labor migration can bring some positive socioeconomic effects, such as a reduction in the level of unemployment in the domestic market of the country, reduction of payments from the state budget for the maintenance of the unemployed and employees of the budgetary sphere, an increase of revenues of money transfers. In the long-term period, international labor migration has extremely negative consequences for donor countries. Indeed, there is an outflow of economically active population to a permanent place of residence in other countries, which leads to an increase in the shortage of labor force in the national labor market (including in the health, education, science, equipment, and labor-intensive professions). Also, tax revenues to the state budget are reduced. Brain outflow means the loss of state resources invested in their education, the narrowing of industry, and the deterioration of the business environment. Reducing the number of able-bodied populations in connection with migration is also a significant fiscal problem. Pressure on public finances will take place on two channels: 1. increase the cost of programs related to age (pensions and health) factor; 2. the innovative potential of economic growth decreases [7].

According to results of Bongers, Díaz-Roldán & Torres (2022), human capital accumulation in the sending country is encouraged by the possibility of emigration to higher labor productivity countries, supporting the recent view of the 'brain gain' hypothesis. Productivity shocks hitting the hosting country reduce the human capital investment by natives but increase the human capital investment in the sending country when migration is allowed. Finally, we find that migration increases world human capital, increasing the stock of human capital in both hosting and sending countries [8].

Reserch made by Sarker, Salam & Firdaus (2024) examines the differences in farm productivity and technical efficiency between female and male labor migrants by focusing on female and male laborers who have lived away from their homes for 6 months or more within the country and its reflection on farm

production. The empirical result shows that the female-labor migrants' farms have 10.3% lower production frontier (maximum frontier yield) and 6.1% higher technical efficiency than male migrants' farms, indicating that they have 4.2% lower productivity. Lower production frontier reflects lower management ability and less attention to farm practice [9].

The purpose of the study is to assess the impact of labour resource spillovers on the level of labour productivity in the EAEU countries.

Methods

The hypothesis of the study is as follows: the return of labour migrants from Russia to the EAEU countries has a positive impact on labour productivity in those economies.

Research Methodological Basis:

1. The indicators under study (see Tables 1 and 2):

– labour migration in the EAEU countries in 2015-2022 (data are based on the Statistical Yearbook of the Eurasian Economic Union, EAEU) [10];

– labour productivity level in the EAEU member states in 2015-2023 (data are given according to World Development Indicators, WB) [11].

2. The object of the research: the EAEU countries, except of Russia, 2015-2023.

3. Research methods: correlation analysis is used to verify the hypothesis (p-value = 5% and 10%).

Table 1 – Indicators of international migration in the EAEU countries, 2015-2022

Years	2015	2016	2017	2018	2019	2020	2021	2022
Armenia								
Migration growth (+), outflow (-)	-25,906	-24,792	-23,962	-18,286	-15,430	3,374	-4,119	6,080
Belarus								
Migration growth (+), outflow (-)								
including:								
the EAEU countries	4,412	1,559	574	1,247	3,690	…	…	…
Kazakhstan								
Migration growth (+), outflow (-)								
including:								
the EAEU countries	-21,479	-26,253	-28,158	-32,746	-36,451	-21,318	-22,983	-13,053
Kyrgyzstan								
Migration growth (+), outflow (-)								
including:								
the EAEU countries	-4,902	-4,452	-4,067	-5,394	-5,946	-5,147	-1,999	3,949

Source: [10]

Table 2 – Labour productivity level of the EAEU countries in accordance with World Development Indicators, 2015-2023

Countries	2015	2016	2017	2018	2019	2020	2021	2022	2023
Belarus	31,494.18	31,843.54	34,599.31	36,811.01	38,701.53	36,562.95	37,622.45	42,474.96	46,480.43
Kazakhstan	50,055.64	48,741.53	49,942.01	51,231.39	51,851.88	51,802.60	53,297.28	50,857.01	53,174.67
Armenia	65,157.51	65,548.53	67,840.84	70,197.64	72,825.90	71,403.31	73,264.22	74,368.80	77,189.93

Countries	2015	2016	2017	2018	2019	2020	2021	2022	2023
Kyrgyzstan	13,342.61	13,821.12	14,671.87	14,817.68	15,328.66	13,967.27	14,212.27	14,854.61	15,438.44

Source: [11]

Results

The results of the correlation analysis are presented in Figures 1-2 and in summary Tables 3 and 4.
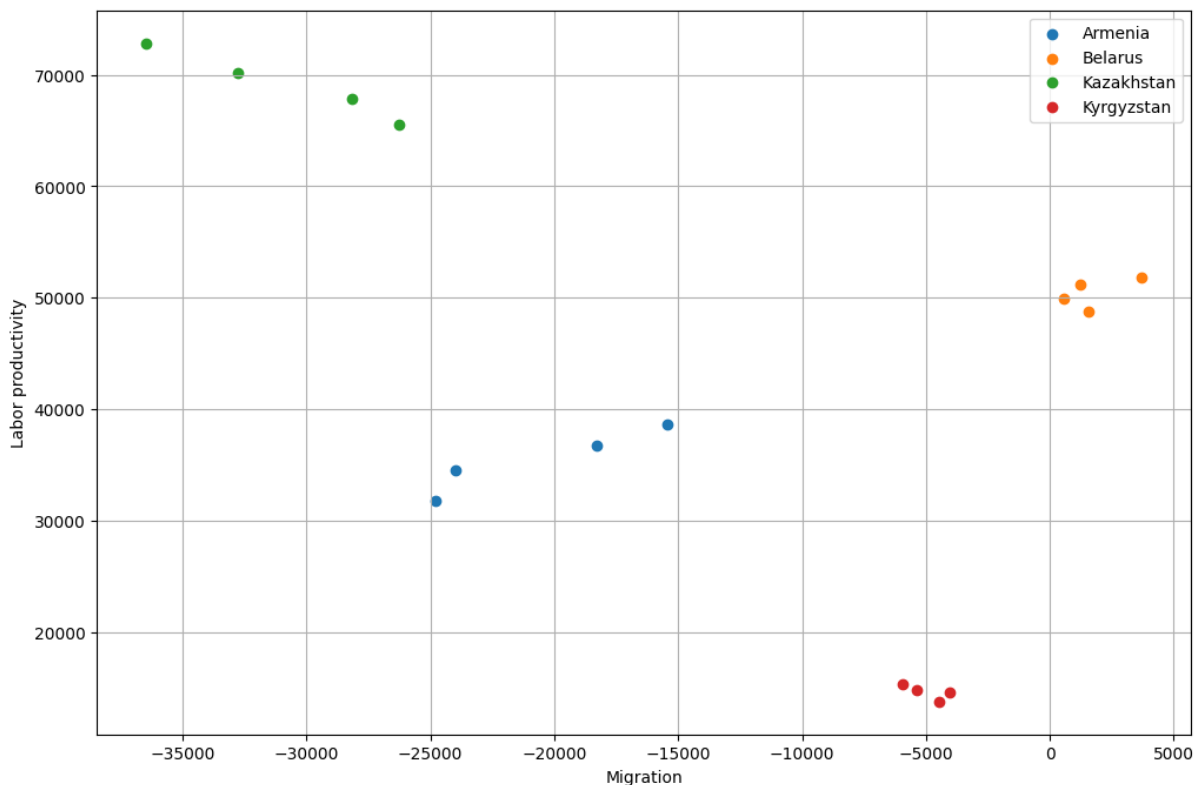
Figure 1. Scatter diagram correlation on labour migration and labour productivity level in the EAEU countries

Source: composed by the authors

Table 3 – Correlation analysis results for the EAEU countries with a 1-year lag

Countries	Correlation Coefficient	P-Value	Power
Armenia	0.9503053667145075	0.04969463328549262	0.26683162443646113
Belarus	0.5814087032673625	0.4185912967326375	0.13280128451812745
Kazakhstan	-0.990660888762283	0.009339111237717024	0.2845769277399174
Kyrgyzstan	-0.708271312939343	0.291728687060657	0.17249001271281394

Source: composed by the authors

The analysis shows:
- Armenia: very high positive and significant correlation at level 5%;
- Belarus: moderate positive but not significant correlation at the level of 5% and 10%;
- Kazakhstan: very high negative and significant correlation at level 5%;
- Kyrgyzstan: high negative but not significant correlation at the level of 5% and 10%.

Further, we verify our hypothesis considering a time lag of 1 year (the propagation of the reverse spillover effect might be not immediate).
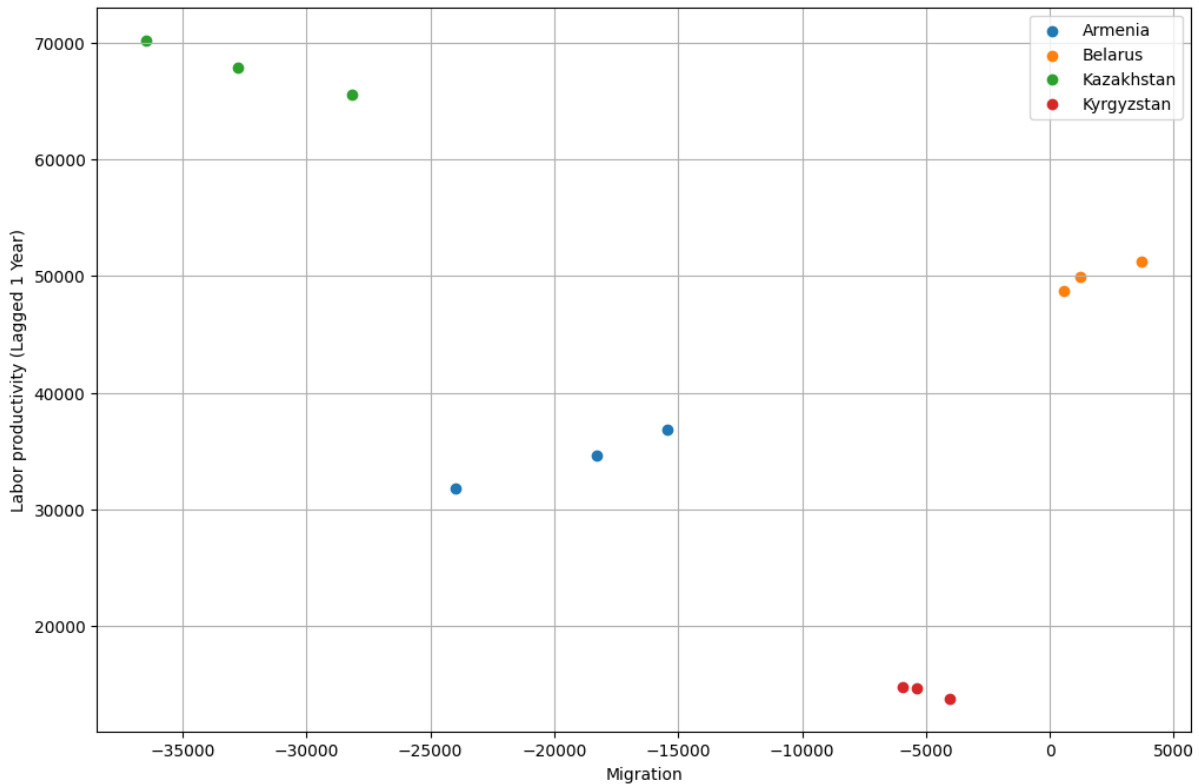
Figure 2. Scatter diagram correlation on labour migration and labour productivity level in the EAEU countries with a time lag of 1 year

Source: composed by the authors

Table 4 – Correlation analysis results for the EAEU countries with a 1-year lag

Countries	Correlation Coefficient	P-Value	Power
Armenia	0.9921466521290774	0.07983754440383034	0.17737531049948574
Belarus	0.9564255806130553	0.18862562326301777	0.16895843243194975
Kazakhstan	-0.9975924501823511	0.044184498761972876	0.1786779108486443
Kyrgyzstan	-0.9881724667171587	0.09801018165730671	0.17642791598478802

Source: composed by the authors

The analysis shows:
  – Armenia: very high positive and significant correlation at the level of 10%;
  – Belarus: very high positive but not significant correlation;
  – Kazakhstan: very high negative and significant correlation at level 5%;
  – Kazakhstan: very high negative and significant correlation at level 5%;

Hence, in Armenia and Belarus there is a positive correlation between labour migration and labour productivity, while in Kazakhstan and Kyrgyzstan there is a negative one.

Conclusion

According to analysis conducted, there is a (multidirectional) statistically significant relationship between the variables under study – labour migration has an impact on the level of productivity in the EAEU countries. Moreover, for two countries – Armenia and Belarus – the growth of labour migration has a positive impact on labour productivity, while for Kazakhstan and Kyrgyzstan – on the contrary, the growth of labour migration reduces labour productivity. This phenomenon requires a more detailed research of the qualitative composition of labour migrants from these countries, including their qualifications, gender, age, etc.

Generally, the results obtained may suggest on low qualification of labour migrants from EAEU countries ('transfer of knowledge' may not occur – workers are employed in low-skilled sectors of the economy).

Therefore, diffusion of technological knowledge and, as a consequence, increase in labour productivity may take a longer time (more than 1 year).

Research limitations:

- data biasing the overall picture by the impact of the coronavirus pandemic and subsequent lockdown in 2020 and 2021;

- external shocks significantly affecting the dynamics of socio-economic development of the EAEU countries;

- incorrectly selected indicators (Global Innovation Index) characterising technological development level of the EAEU countries;

- perhaps, correlation analysis was not optimal one for research purpose addressing (the research methodology is being tested for adequate to the research objectives).

However, research results could provide a number of applied researches on interregional labour migration in the EAEU countries.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR'S CONTRIBUTIONS

Marina A. Mayorova – correlation analysis; data visualisation;
Denis V. Gerasimov – data collection and processing; literature review;
Marina A. Ugryumova – the concept of the research; writing the original text.

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Adaptation to climate change as a key factor in ensuring international competitiveness

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ORIGINAL ARTICLE

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Abstract. Nowadays, there is negative dynamics in climate change on the planet. It indicates a deficit in measures of climate adaptation changes both at the national and global economic levels. The purpose of the research is to form the requirements for assessing the effectiveness of addressing climate adaptation challenges in terms of the new Climate Doctrine of the Russian Federation as a key factor in ensuring international competitiveness in modern conditions. Those based on theoretical and methodological analysis, as well as the challenges and prospects of adaptation to climate change at the national economy level. The novelty of the results concerns with the substantiations based on the requirements of the Climate Doctrine of the Russian Federation, an approach to assessing the effectiveness of national economy adaptation to climate change as a key factor in ensuring international competitiveness. The practical significance of the results obtained considers the possibility of their use in assessing the effectiveness of national economy adaptation to climate change in accordance with the requirements of the Climate Doctrine of the Russian Federation.

Introduction

Climate change is one of the most serious challenges of the 21st century. According to the Climate Doctrine of the Russian Federation, "it is out of scientific discussions and represents a complex interdisciplinary problem covering environmental, economic, and social aspects of sustainable development of the Russian Federation"[1].

Nowadays, there is global negative dynamics in climate change. It indicates a deficit in measures of climate adaptation to these changes [3, 5] both at the national and global economic levels.

Moreover, there is an increasing scientific publications on "human economic activity, primarily related to greenhouse gas emissions, increasingly affects the climate against the background of its natural variability"[2].

The development of the global economy clearly demonstrates the following:

– firstly, different countries differently deal the problem of climate adaptation;

– secondly, the success of addressing climate change adaptation is one of the decisive factors of the international competitiveness.

In this regard, there is a need for further improvement of approaches to assessing the effectiveness of addressing climate change adaptation.

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[1] *Vedomosti. (2022). Adaptation to climate change is a process, not a one-time event. Retrieved from: https://www.vedomosti.ru/ecology/climate/articles/2022/11/11/949904-adaptatsiya-k-izmeneniyam-klimata-eto-protsess-a-ne-razovoe-meropriyatie (accessed 30.04.2024) (in Russian).*

[2] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian)*

These factors determined the choice of the research topic and objectives.

The purpose of the research is to form the requirements for assessing the effectiveness of addressing climate change adaptation in terms of the new Climate Doctrine of the Russian Federation. Nowadays, it is a key factor in ensuring international competitiveness. Those based on theoretical and methodological analysis, as well as the challenges and prospects of adaptation to climate change at the national economy level.

Methods

The research methodological base consists in scientific works on addressing climate change adaptation by Nikolaev N.P. [4], Tarasova O.S. [6], Shelomentsev A.G., Goncharova K.S. [11], Serebritsky I.A.[3], Gasha E.[4], Porfiriev B.N., Terentyev N.E. & Zinchenko Yu.V. [5], Klaptsov V.M.[5], as well as [7-10], etc.

The research methodological basis is formed by relevant analytical materials on addressing climate change adaptation[6], etc.

We considered the Climate Doctrine of the Russian Federation as a main normative act.
Results

The structure of the Climate Doctrine of the Russian Federation [30] is shown in Fig. 1. Firstly, we focus on the analysis of its general provisions, climate adaptation goals, and basic principles.

Figure 1. The structure of the Climate Doctrine of the Russian Federation
Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation"[7]

Analysing the Climate Doctrine of the Russian Federation adopted in October, 2023, we consider the allocation of fundamental and applied scientific knowledge in climate and related fields (Fig. 2). It determines the personnel training on adaptation to climatic conditions changes.

The directions of scientific knowledge highlighted in figure 2 are the basis for further scientific research on climate adaptation, personnel training in terms of adaptation to climate changes.

The algorithm for using knowledge on climate (Fig.2) in addressing the challenges of climate adaptation provided for by the Climate Doctrine of the Russian Federation is presented in figure 3.

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[3] *Serebrickij, I. A. (2020). International experience in managing adaptation to cli-mate change. Retrieved from: https://climatescience. ru/articles/5e9ef5ddc810400019470e50 (accessed 30.04.2024) (in Russian)..*

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[5] *Klaptsov, V. M. (2011). Measures for adaptation to climate change. Retrieved from: https://riss.ru/analitica/mery-po-adaptatsii-k-izmeneniyam-klimata/ (accessed 30.04.2024) (in Russian).*

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[7] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*
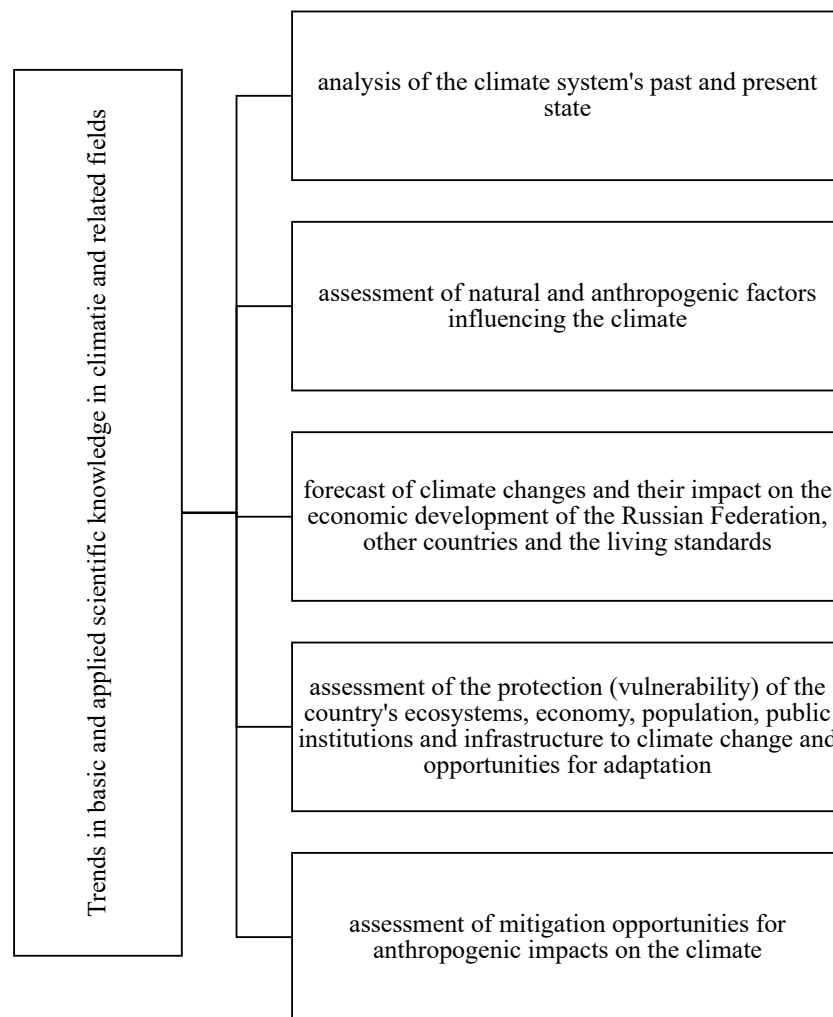
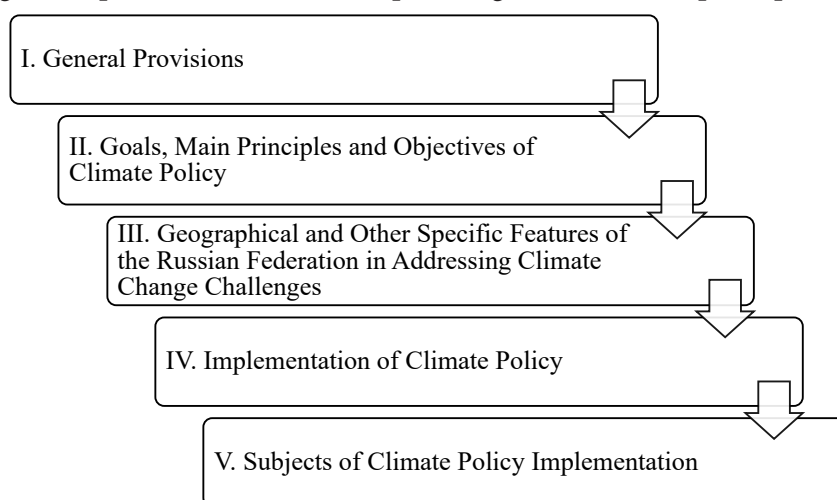**Figure 2.** Fundamental and applied scientific knowledge on climate and related fields, according to the Climate Doctrine of the Russian Federation
Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation" [8]

The main challenges on climate change and the general approach to their addressing provided by the Climate Doctrine of the Russian Federation [30] are presented in figure 4.

According to the national development goals of the Russian Federation until 2030 and for the perspective until 2036, defined by the Decree the President of the Russian Federation on 07.05.2024 No. 309[9], there is a need to take climate change into account as one of the key long-term security factors of the Russian Federation. It combined with the recognition of global climate change problem as one of the priorities of the country's domestic and foreign policy. It is also evidenced by achieving environmental well-being as one of two fundamentally new goals compared to the previously adopted national development goals. It also was defined by Decree of the President of the Russian Federation on 21.07.2020 No. 474[10]. Moreover, it was expanded by the new document compared to the previously adopted presidential decree (Fig. 5).

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[8] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*
[9] *Decree of the President of the Russian Federation on 07.05.2024 N 309 "On the National Development Goals of the Russian Federation Until 2030 and For the Future Until 2036". Retrieved from: http://publication.pravo.gov.ru/document/0001202405070015?index=1 (accessed 30.04.2024) (in Russian).*
[10] *Decree of the President of the Russian Federation on 27.07.2020 N 474 "On the National Development Goals of the Russian Federation Until 2030". Retrieved from: http://publication.pravo.gov.ru/Document/View/0001202007210012 (accessed 30.04.2024) (in Russian).*

Analysis of climate change research results conducted in the Russian Federation, other states and regions and impact of the consequences of this change on various sectors of the economy, the population and the environment, including the results of work on the practical use of climate data by public authorities.

Recognition of human influence on climate against the background of its natural variability, resulting in significant, predominantly unfavourable consequences for humans and the environment.

Identification as a feature of climate response to both anthropogenic impacts and measures to alleviate anthropogenic impacts, climate forcing lags in relation to these impacts and measures.

The importance of adaptation inevitable in the coming decades to climate change, and sustained action to alleviate anthropogenic impacts on the climate in the short, medium and long terms.

Figure 3. An algorithm for using knowledge on climate in addressing the challenges of climate adaptation provided for by the Climate Doctrine of the Russian Federation

Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation"[11]

Combination of scientific methods with the implementation of political procedures

Increased frequency and intensity of climatic anomalies and extreme weather phenomena

Addressing potential conflicts of interest regarding extreme climate change effects

Influence of climate change on humans, flora and fauna

Balancing economic efficiency and social justice

Addressing climate change challenges

A threat to the population well-being and sustainable development.

Figure 4. The main challenges of climate change and the general approach to their addressing provided by the Climate Doctrine of the Russian Federation

Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation"[12]

[11] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*
[12] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*

Goals	
until 2030	until 2030 and for the perspective until 2036

A	
population conservation, human health and well-being	population conservation, health improvement, well-being of people and family support

B	
opportunities for self-actualisation and talent growth	realisation of each person's potential, talent growth, education of a patriotic and socially responsible person

C	
comfortable and safe living environment	comfortable and safe living environment

D	
decent, effective labour and successful entrepreneurship	**environmental comfort**

E	
digital transformation	sustainable and dynamic economy

G	
	technological leadership

H	
	digital transformation of state and municipal governance, economy and social sphere

Figure 5. Correlation of national development goals of the Russian Federation until 2030 and national development goals of the Russian Federation until 2030 for the perspective until 2036

Source: Decree of the President of the Russian Federation on 07.05.2024 N 309[13] *& Decree of the President of the Russian Federation on 27.07.2020 N 474*[14]

The basis for further reducing the negative consequences of climate change, as defined in the Climate

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[13] *Decree of the President of the Russian Federation on 07.05.2024 N 309 "On the National Development Goals of the Russian Federation Until 2030 and For the Future Until 2036". Retrieved from: http://publication.pravo.gov.ru/document/0001202405070015?index=1 (accessed 30.04.2024) (in Russian).*

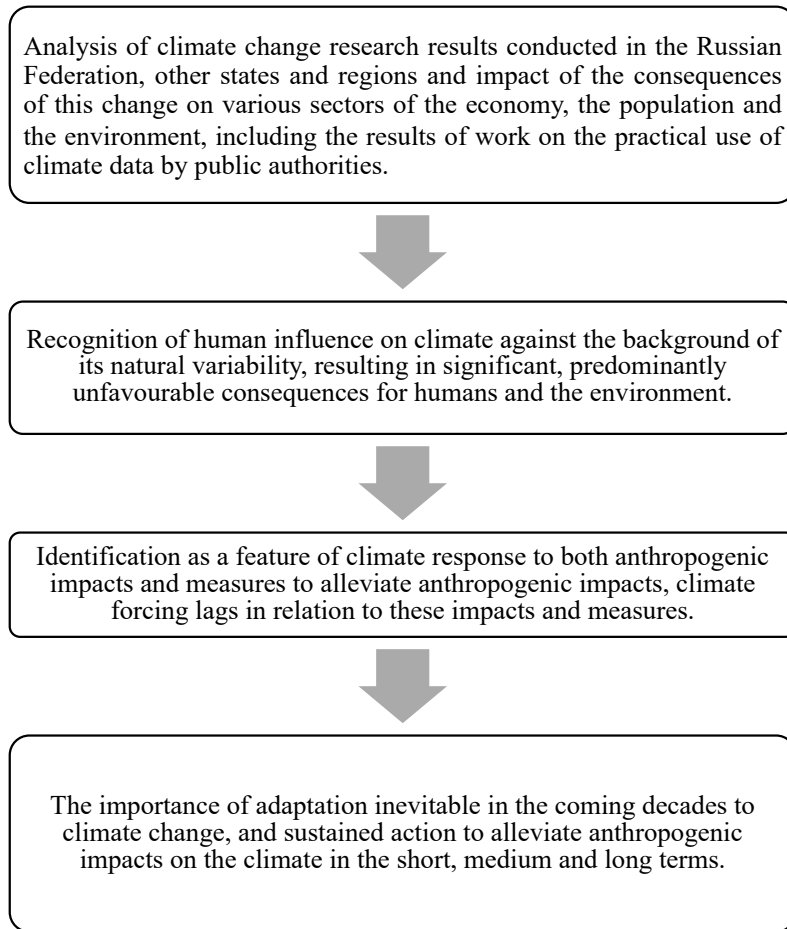[14] *Decree of the President of the Russian Federation on 27.07.2020 N 474 "On the National Development Goals of the Russian Federation Until 2030". Retrieved from: http://publication.pravo.gov.ru/Document/View/0001202007210012 (accessed 30.04.2024) (in Russian).*

Doctrine, was the implementation of decisions by the Russian Federation, adopted in the documents presented in figure 6. However, these climate change adaptation solutions have also contributed to the development of international competitiveness.

Implementation of the Kyoto Protocol first period on 11 December 1997 - limitation of anthropogenic emissions of greenhouse gases

Implementation of the Paris Agreement on 12 December 2015 - limitation the increase in global average temperature to 1.5 °C

Implementation of the Decree of the President of the Russian Federation No. 666 on 4 November 2020 "On Reducing Greenhouse Gas Emissions" reducing emissions by 2030 to 70% of the 1990 level

Figure 6. The basis for further reducing the negative consequences of climate change, as defined in the Climate Doctrine

Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation"[15]
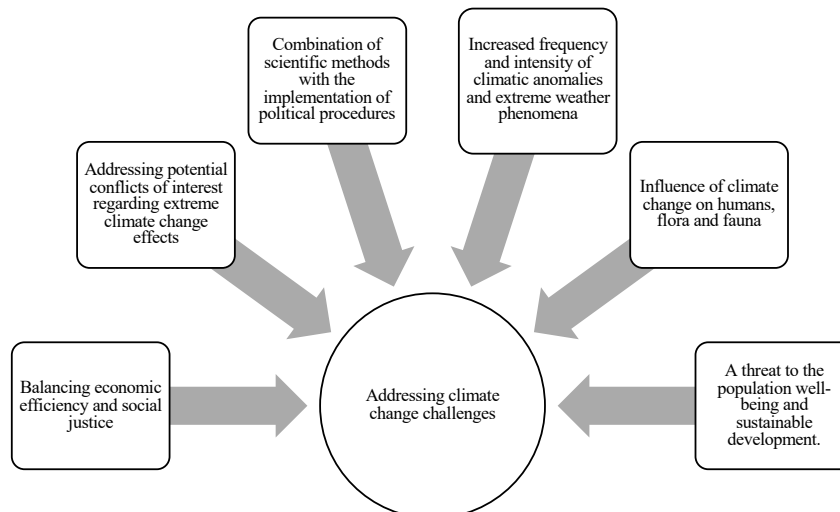
The content of the Climate Doctrine of the Russian Federation [30] and the objectives of the country's climate policy are presented in figure 7 and 8, respectively.

Goals of the Climate Doctrine of the Russian Federation

The strategic goal is to ensure safe and sustainable development of the Russian Federation, including institutional, economic, environmental and social, demographic, factors, in terms of climate change and the emergence of associated threats

The key long-term goal is to achieve a balance between anthropogenic greenhouse gas emissions and their absorption, considering national interests and priorities of socio-economic development, by 2060

Figure 7. The content of the Climate Doctrine of the Russian Federation

Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation"[16]

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[15] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*
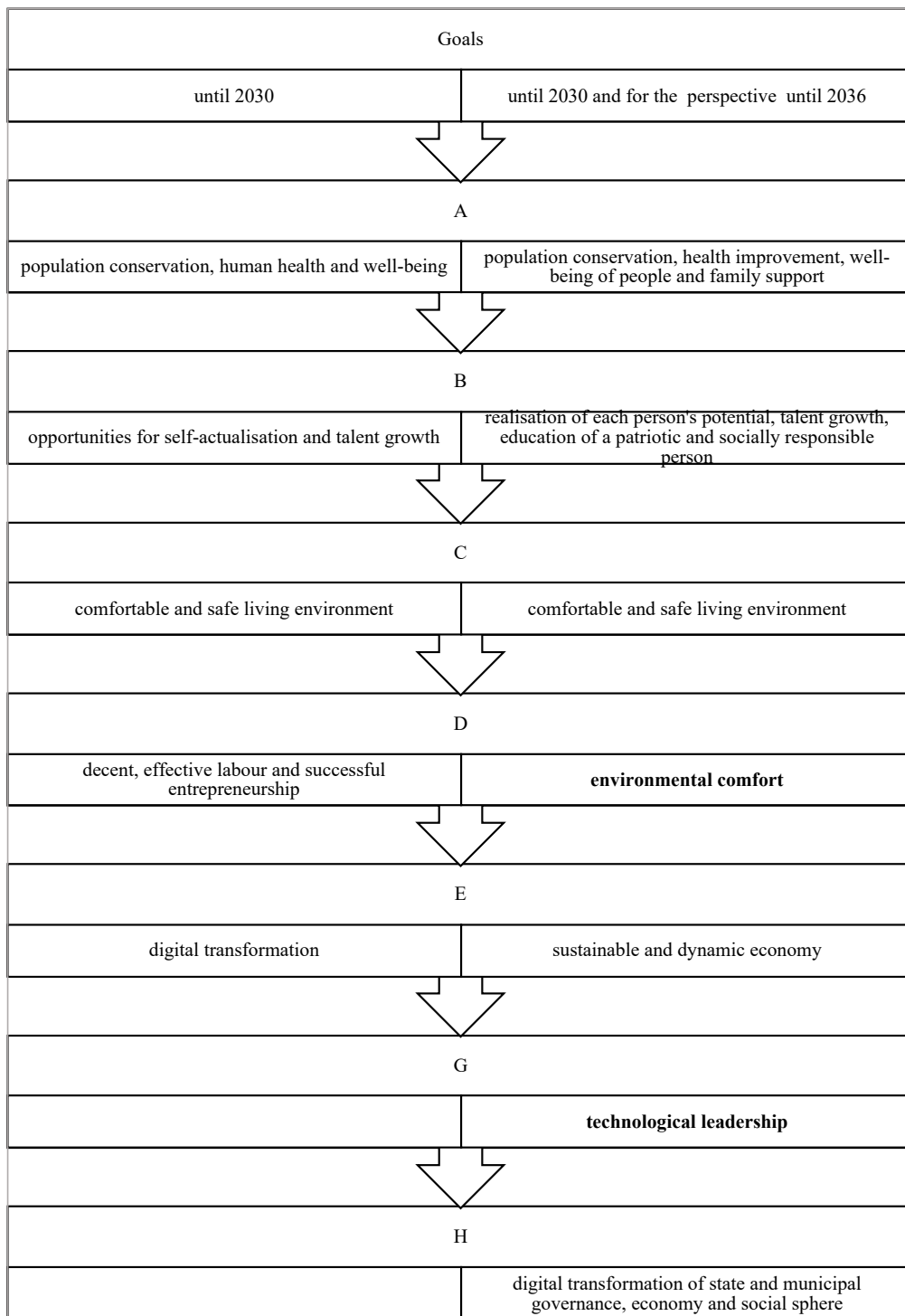[16] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*

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Climate policy
objectives
    ├── Development of informational and scientific basis for climate policy
    │       └── Enhancement of scientific, technical and technological potential of the Russian Federation to ensure completeness and reliability of climate information, anthropogenic and other impacts on the climate, its current and future changes and their consequences
    ├── Development and implementation of operational and long-term adaptation measures
    ├── Development and implementation of operative and long-term measures to alleviate anthropogenic impact on the climate
    │       └── Establishment of regulatory and economic mechanisms to implement measures to reduce and prevent greenhouse gas emissions as part of the international obligations of the Russian Federation, as well as to increase their absorption
    ├── Development of a set of measures to reduce (prevent) greenhouse gas emissions or increase their absorption (climate projects)
    │       └── The measures can be realised in the Russian Federation, other states and regions
    └── Development of mutually beneficial co-operation on climate change and related issues on a bilateral and multilateral basis
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Figure 8. The composition of the country's climate policy objectives defined by the Climate Doctrine of the Russian Federation
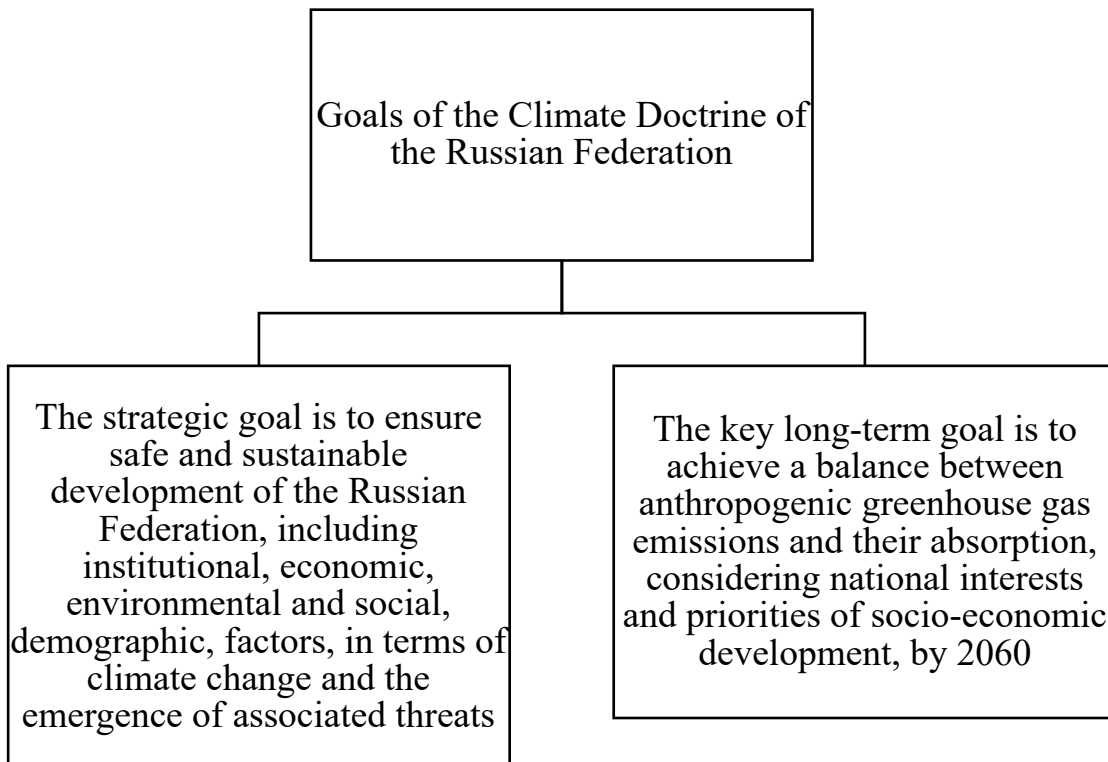
Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation"[17]

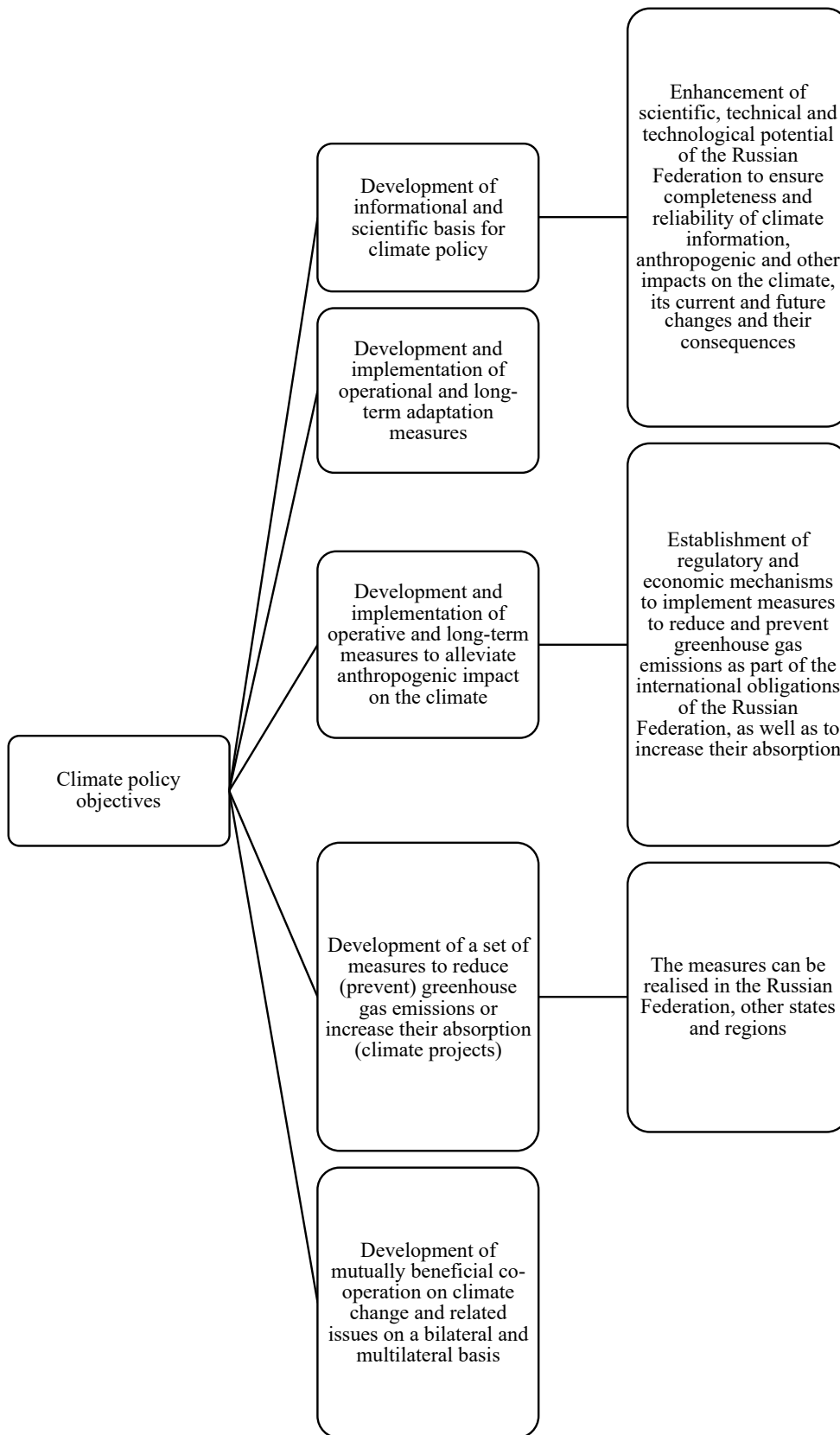[17] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*

In terms of forming the requirements to the measures for assessing the climate adaptation efficiency as a factor of international competitiveness, it is important to consider the main principles of climate policy, defined in the Climate Doctrine of the Russian Federation (Fig. 9).
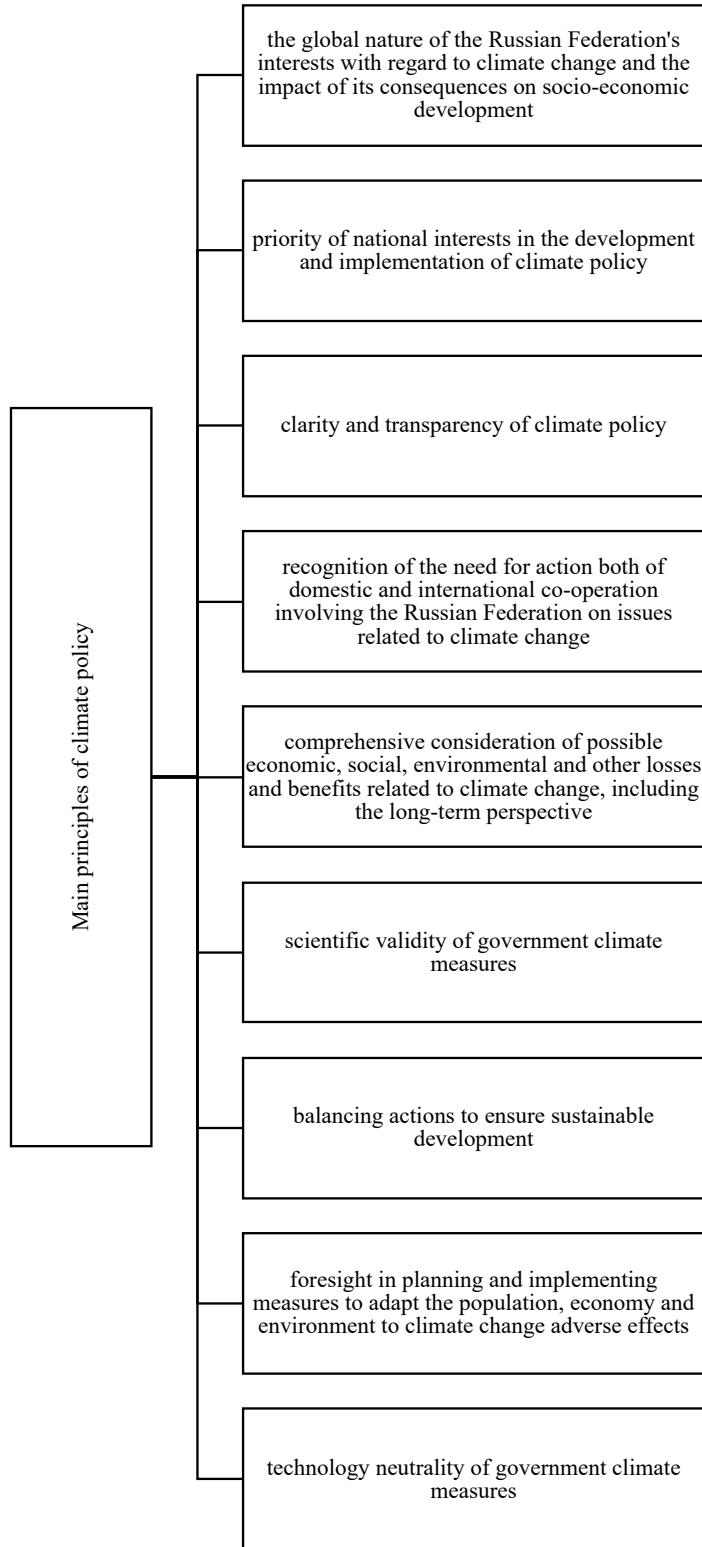
Main principles of climate policy

- the global nature of the Russian Federation's interests with regard to climate change and the impact of its consequences on socio-economic development
- priority of national interests in the development and implementation of climate policy
- clarity and transparency of climate policy
- recognition of the need for action both of domestic and international co-operation involving the Russian Federation on issues related to climate change
- comprehensive consideration of possible economic, social, environmental and other losses and benefits related to climate change, including the long-term perspective
- scientific validity of government climate measures
- balancing actions to ensure sustainable development
- foresight in planning and implementing measures to adapt the population, economy and environment to climate change adverse effects
- technology neutrality of government climate measures

Figure 9. The basic principles of climate policy defined in the Climate Doctrine of the Russian Federation
Source: Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation"[18]

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[18] *Decree of the President of the Russian Federation N 812 on 26/10/2023 "On Approval of the Climate Doctrine of the Russian Federation". Retrieved from: http://publication.pravo.gov.ru/document/0001202310260009 (accessed 30.04.2024) (in Russian).*

In terms of the goals of the Climate Doctrine of the Russian Federation (Fig.7), the degree of achievement of a key long-term goal can be considered as a generalised criterion for assessment the effectiveness addressing climate adaptation challenges:

$$E_{KLTG}=Q_{GG}/Q_{GGE}, \tag{1}$$

where:

E_{KLTG} is the effectiveness of achieving the key long-term goal of the Climate Doctrine of the Russian Federation,

Q_{GG} is the absorbed volume of anthropogenic greenhouse gas emissions,

Q_{GGE} volume of anthropogenic greenhouse gas emissions.

The value of criterion (1), according to the Climate Doctrine of the Russian Federation, should satisfy equality by 2060: $E_{KLTG} = 1$.

Therefore, on the basis of the strategic goal components of the Climate Doctrine of the Russian Federation (Fig. 7), which are closely related to the objectives of the Climate Doctrine of the Russian Federation (Fig. 8), we would like to draw attention to general approach to assessing the dynamics of achieving climate change adaptation goals of any planning horizon (from short-term to long-term) can be formed on the basis of the main principles of the Climate Change Adaptation Strategy of the Russian Federation (Fig. 7).

The criterion for assessment the effectiveness in addressing climate adaptation challenges, formed in terms of the basic principles of the Russian Federation climate policy (Fig. 9). It reflects a general approach to assessing the dynamics of climate change adaptation goals as follows:

$$E_{DA}(t)=a{\times}IC_{SEV}(t) + b{\times}PNI_{CPI}(t) + c{\times}CN_{CP}(t) + d{\times}AD_{CCR}(t) + e{\times}TC_{PB}(t)+f{\times}SV_{GM}(t) + g{\times}VA_{ESD}(t) + h{\times}DM_{AECC}(t) + j{\times}TM_{GMC}(t), \tag{2}$$

where:

$E_{DA}(t)$ is a generalized criterion for assessment the effectiveness in addressing climate adaptation challenges, reflecting a general approach to assessing the dynamics of achieving the goals of climate change adaptation,

$IC_{SEV}(t)$ is a particular criterion for assessing the dynamics of the impact of the effects of climate change on the socio-economic development of the Russian Federation;

$PNI_{CPI}(t)$ is a particular criterion for assessing the dynamics of compliance with the priority of national interests in the development and implementation of climate policy;

$CN_{CP}(t)$ is a particular criterion for assessing the dynamics of clarity and transparency of the Russian Federation climate policy;

$AD_{CCR}(t)$ is a particular criterion for assessing the dynamics of activity both at the domestic level and within the framework of international cooperation on issues related to climate change;

$TC_{PB}(t)$ is a particular criterion for assessing the dynamics of comprehensive consideration of possible economic, social, environmental, and other losses and benefits associated with climate change;

$SV_{GM}(t)$ is a particular criterion for assessing the dynamics of the scientific validity of government measures in terms of climate;

$VA_{ESD}(t)$ is a particular criterion for assessing the dynamics of balanced actions to ensure national economy sustainable development;

$DM_{AECC}(t)$ is a particular criterion for assessing the dynamics of foresight in planning and implementing measures to adapt the population, economy, and environment to the adverse effects of climate change;

TM_{GMC} is a particular criterion for assessing the dynamics of technological neutrality of governmental measures implementation in terms of climate.

a is the weighting coefficient of a particular criterion for assessing the dynamics of the impact of climate change on the socio-economic development of the Russian Federation;

b is the weighting coefficient of a particular criterion for assessing the dynamics of compliance with the priority of national interests in climate policy development and implementation;

c is the weighting coefficient of a particular criterion for assessing the dynamics of clarity and transparency of the Russian Federation climate policy;

d is the weighting coefficient for assessing the dynamics of activity both at the domestic level and within the framework of international cooperation on issues related to climate change;

e is the weighting coefficient of a particular criterion for assessing the dynamics of comprehensive consideration of possible economic, social, environmental and other losses and benefits associated with climate change;

f is the weighting coefficient of a particular criterion for assessing the dynamics of government measures scientific validity in terms of climate;

g is the weighting coefficient of a particular criterion for assessing the dynamics of balanced actions to ensure national economy sustainable development;

h is the weighting coefficient of a particular criterion for assessing the dynamics of foresight in planning and implementing measures to adapt the population, economy and environment to the adverse of climate change effects;

j is the weighting coefficient of a particular criterion for assessing the dynamics of technological neutrality of governmental measures implementation in terms of climate.

Conclusions

Nowadays, negative dynamics in climate change on the planet remains. It indicates a deficit in measures of climate adaptation to changes both at the national and global economic levels. The presented study forms the requirements for assessing the effectiveness of addressing climate adaptation challenges in terms of the new climate doctrine of the Russian Federation as a key factor in ensuring international competitiveness in modern conditions.

As a generalised criterion for assessing the effectiveness of addressing climate adaptation challenges, we propose to consider the degree of achievement of the key long-term goal of the Climate Doctrine of the Russian Federation as ratio of the absorbed volume of anthropogenic greenhouse gas emissions to the volume of anthropogenic greenhouse gas emissions.

The criterion for assessing the effectiveness of addressing climate adaptation challenges, formed on the basic principles of the Russian Federation climate policy, reflecting a general approach to assessing the dynamics of achieving the goals of adaptation to climate change. It includes specific criteria for assessing its dynamics: the impact of climate change consequences on the socio-economic development of the Russian Federation; compliance with the priority of national interests in climate policy development and implementation; clarity and transparency of the Russian Federation climate policy; active actions both at the domestic level and within the framework of international cooperation on issues related to climate change; comprehensive consideration of possible economic, social, environmental and other losses and benefits associated with climate change; scientific validity of state measures in terms of climate; balanced actions to ensure national economy sustainable development; the foresight in planning and implementing measures to adapt the population, economy, and environment to climate change adverse effects; the implementation of technology-neutral state climate measures.

We plan to substantiate approaches to assessing the effectiveness of addressing climate adaptation challenges as a key factor of international competitiveness. It is envisaged to form efficiency criteria in terms of the objectives of the Russian Federation climate policy, geographical and other features of addressing climate adaptation challenges, requirements for implementing climate policy provided for by the Climate Doctrine of the Russian Federation.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION
Alexey V. Tebekin – conceptualization, project administration, writing – original draft.
Oleg E. Lomakin – formal analysis; writing – review & editing.

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Trends and prospects for ensuring the Russian economy competitiveness in the context of economic and political sanctions

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Abstract. Currently, the global economy is undergoing global processes associated with the transition from monopolar to a multipolar world. Previously, the United States played a leading role in those monopolar world. It causes change in the conditions of competition in the global economy. Under these conditions, the United States, unable to ensure its competitiveness legally, began to actively use economic sanctions against Russia. Moreover, the USA forces the EU and the NATO bloc countries do the same. Meanwhile, the U.S. considers development of the Russian economy competitiveness and SMO as tools for maintaining its leading position in the global economy. However, the Russian economy transforms to external challenges in accordance with the national interests. Nevertheless, there are issues of ensuring the Russian economy competitiveness in the context of economic and political sanctions. They require scientific verification at present and in the future. The conclusions are as follows: the Russian economy is currently facing the challenge of ensuring its competitiveness in terms of global changes in the world economy, the US and EU countries sanctions pressure; it is necessary to integrate into the global economy as a developed economy, including using the BRICS as the largest importer of resources and high-tech products; to ensure national sovereignty, it is necessary to accelerate the withdrawal of the Russian economy's dependence on the dollar; there urgently needs to reconfigure higher education to train professionals; it is necessary to establish the domestic theory of organisation management a basis for practical provision of effective activities of domestic organisations.

Keywords: competitiveness; economic sanctions; de-dollarisation; problems of the Russian economy; higher professional education

Introduction

Today, a difficult economic situation is developing in the world. It is associated with the process of transition from a monopolar to a multipolar world. Moreover, it actualises the issues of ensuring the national economies competitiveness, including the Russian one.

The purpose of the article is to consider the main issues and ways to ensure the Russian economy competitiveness under economic sanctions. However, it is a necessary condition for ensuring the country's security by addressing issues of technological leadership and economic self-sufficiency.

The issues of national economies competitiveness have been considered by many researchers. For instance, in 1990, M. Porter developed the theory of competitive advantages of organizations [10, 11]. However, speaking about international competitiveness, he noted the absence of generally accepted scientific concept of competitiveness.

According to N.Z. Safiullin and L.N. Safiullin, "one of the reasons for the current situation in the domestic

and international market is the insufficient theoretical and methodological elaboration of competitive relations of the transitive economy. There are no generally recognised systematic methodological approaches to the analysis of competition problems. Currently, domestic economic science contains fragmented studies on certain aspects of competition, monopolism, competitiveness, competitive advantages, etc." [13, p. 4]. This is evidenced by various studies of domestic economists and scientists [1-6].

Indeed, the US has dominated the world economy primarily through the use of the dollar as the world's reserve currency; it was used as a tool to ensure its economy competitiveness and economic pressure on other countries. As a result, they used world economy globalisation concept to make other countries national economies to $ US dollar dependence for a long time. However, the U.S. economy was forced to focus on rather large imports of products from other countries. I it was "necessary to support the constant emission of the dollar, including its global distribution" [11]. Meanwhile, over the years of globalisation, America received rather than produced the widest range of goods necessary for its economy. Today, the situation is changed. For instance, the United States has largely become dependent on the Chinese economy. According to the report of the US Department of Defense on Strengthening Defense-Critical Supply Chains, there is dependence of the world's largest economies on each other. More than 300 key products critically needed for the American army were completely dependent on supplies from China[1].

Simultaneously, the use of the Internet has resulted in new opportunities to strengthen different countries competitiveness in the new economic and technological realities. Concomitantly, the physical borders of states and language barriers ceased to be an obstacle to national economies development[2]. Countries began to actively use fast and secure online payment systems, transport deliveries, etc. Meanwhile, the global financial crisis of 2008-2010 clearly showed the declining of globalisation attractiveness and provided the tendency towards fragmentation of national economies, i.e. many countries began to pursue policies to protect national economic interests, including in trade, capital, migration, technology exchange, etc. For instance, after Britain exited the European Union in 2016, the United States and China began the trade wars. They manifested in a number of the US prohibitive measures for limiting China's competitiveness, etc.[3].

Main part

The Russian economy has developed special measures to ensure its competitiveness under economic and political sanctions. For instance, the American journalist K. Morris called the US President D. Biden's Law on the confiscation of frozen assets of the Russian Federation (April 2024) the declaration of economic war with Russia[4].

However, such US policy and interference in the economy of other countries have to a negative impact on the entire global economy. As a result, according to the annual report of E.M. Primakov at National Research Institute of World Economy and International Relations of the Russian Academy of Sciences, the main issues of global economic development in 2024 are as follows:

- the pace of global economic growth slows to demographic and structural factors;

- China's economy contributed the most to global economic growth over the past two decades, will slow its pace of development;

- neither developed countries nor China currently have any other way to support economic growth, except through an increase in the debt burden, which has already reached a high level [12].

According to statistics by the US Treasury on January 3, 2024, the US national debt exceeded $ 34 trln USD, having increased by almost 10% in 2023, that is, by $ 2.7 trln USD[5]. US dollar could lose its position as

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[5] *Penkal'skaya, A. (2024). The US national debt 2024: what is it and how it threatens the global economy. Retrieved from: https://*

the world's reserve currency; as a result, the US economy will lose its leading status, too.

However, the US budget deficit causes more aggressive foreign policy, ensuring the necessary level of competitiveness. It is also provided the involvement of countries supported economic sanctions against the Russian economy. Indeed, the increased influence of the United States on finance will negatively affect the economies of all countries interacting with them, for instance, the EU countries. Currently, experts claim "the irrational anti-Russian sanctions imposed by the United States have mainly affected Europe". European countries faced a serious energy crisis; it causes "a gradual process of deindustrialisation and economic degradation" of Germany and France[6]. According to the President of the Russian Federation V.V. Putin, Germany, by rejecting the Russian car market, is now destroying its car industry[7].

At the same time, in the interests of ensuring its national economic interests, the United States began to use military force more actively against real and potential competitors, involving, among other things, its partners in the NATO military bloc. Previously, the United States and its NATO partners militarily defeated the economies of Iraq, Libya, Yugoslavia; an attempt was made to destroy the Syrian economy. The major USA interest were cheap raw materials. For instance, the United States still practically maintains military bases in Syria without the consent of the country's leadership and practically "steals" Syrian oil for the needs of its economy. In 90s of 20th century the United States defined the Russian economy as a source of cheap oil and gas. Nowadays, the USA tend to destroy the Russian economy by effective methods of military influence.

As a result, global economic competition has increasingly begun to be influenced by the USA military policy.

However, the United States could not directly apply military measures against Russia. Therefore, the US tried to destroy the Russian economy during the Cold War.

But the strengthening of Russia's economic power and its active participation in the global economy alarmed the United States. Indeed, in 2006, within the framework of the St. Petersburg Economic Forum, the BRICS organization was created; the share of the participating countries is 1/3 of the global GDP. However, activity of Russia and the development of the Russian economy began to be perceived by the United States as a new global threat to its global economic and military-political dominance. Moreover, Russia acted as a new force against of aggressive US actions in Syria and damage to the economic, political, and military prestige of the United States.

As a result, the United States and countries under its influence introduced economic and political sanctions to undermine Russian economic potential and exclude it from the economic and political competitors. At the same time, the United States had a desire, following the example of the war with Iraq and Libya, to defeat Russia in real military conditions. Therefore, the United States used Ukraine. Ukraine has huge financial and military assistance in the war against Russia in order to weaken its competitive capabilities.

However, all the efforts of the United States against the Russian economy were ineffective ones. According to Russian Prime Minister M. Mishustin, "the Russian economy is confidently adapting to external challenges and transforming based on its own national objectives." Moreover, "GDP growth accelerated to 7.7%, the extractive and manufacturing production expanded, and consumer activity strengthened"[8].

Noteworthy, for more than 10 years the Russian economy has been resisting aggressive economic and political sanctions from the United States and Western countries. The key factors allowing to achieve this result were the reorientation of foreign trade flows towards neutral and friendly countries, the expansion of domestic demand through increased government spending, and a sufficiently balanced macroeconomic policy. This allows th country to avoid destabilisation of the national economy under external pressure.

Firstly, the Russian economy managed to switch to the domestic Mir payment system rapidly; those

quote.rbc.ru/news/article/645e58c89a7947668c1aadf6 (accessed 10.07.2024) (in Russian).
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replaced the American Visa and Mastercard payment systems. It ensured the independence of transactions processed within the country and the inability to disable the use of Mir plastic cards. Surely, this limited the use of plastic cards by Russians abroad. However, it made possible to eliminate the threat of artificially creating a financial crisis in the Russian economy from the United States.

Secondly, the Russian economy has largely managed to reorient its imports to the growing Asian and African markets. Obviously, the Russian economy suffered certain damages from the loss of the EU market. However, at this stage it was more important to find new ways to sell products than to maximise profits from exports.

Thirdly, the Russian economy has begun to use an import substitution strategy. It allows it to avoid shortage of goods, resources, services, and the economic crisis. Indeed, for quite a long time it was more profitable to import the necessary equipment, components, goods, developments and raw materials from abroad than to produce Russian analogues. According to experts, the share of imports in the machine tool industry was 50-60%, in the electronics industry – 80-90%, in the ltextile, clothing and footwear industry – 70-80%. Therefore, the significant share of imports was almost in every field[9].

Fourth, the Russian economy began to dedollarise the Russian economy and increase the share of interstate settlements in national currencies, etc. According to the Minister of Finance A. Siluanov, the rate of settlements in national currencies between Russia and China has increased to 90%. It helped to avoid economic crises caused by the US and EU countries blocking of Russia's dollar accounts[10].

Fifth, the Russian economy has begun to respond to the anti-Russian economic sanctions. For instance, Russia banned the export of wood, including fuel based on it, pellets and briquettes as response to economic sanctions provided by Finland. Indeed, this product is of critical importance for a number of European countries: birch balances serve as the main raw material for paper production; plywood ridge used for plywood production and fuel chips are critically important goods for the European Union. Additionally, the State Duma has now passed a bill to denounce the agreement with the United Kingdom, which has been in force for almost 70 years. This act allows the British to fish in the Russian zone of the Barents Sea. Therefore, Britain has a chance to stop the national dish-fish and chips. Earlier, Russia banned the Japanese from fishing in the Southern Kuriles, etc. This has disrupted favourable conditions for these countries economic development, believing they can declare unrequested economic sanctions, and deprived them of certain essential Russian resources.

Meanwhile, the US itself announces anti-Russian economic sanctions selectively in order not to reduce its economic competitiveness; the US do not consider the economic losses of its "anti-Russian sanctions partners". According to S. Zainullin, PhD in Economics, Professor at Synergy University, the new US anti-Russian sanctions, including those on the Arctic Nord Stream 2, will be paid for by the European allies in the NATO bloc. He considers the sanctions on the Arctic Nord Stream 2 as unfair competition measures aimed at maintaining high prices for liquefied natural gas to generate superprofits for American oil and gas companies, including those supplied to the European market. However, high gas prices will destroy European industrial enterprises and decrease the competitiveness of the European economy[11].

And even with Russia conducting a special military operation in Ukraine, where huge resources of the United States and NATO countries are involved against Russia, the Russian economy in 2023 showed signs of successful, albeit short-term adaptation to unprecedented sanctions challenges caused by a sharp increase in geopolitical contradictions with the United States and other leading economically developed countries.

Hence, the Russian economy has provided its survivability in the new geopolitical environment. However, this can be considered only tactical successes of the Russian economy in ensuring its competitiveness.

[9] Buhtiyarova, N. (2022). SMEs and import substitution: answers of Russian companies to our questions. Retrieved from: https://journal.sovcombank.ru/biznesu/msp-i-importozameschenie-otveti-rossiiskih-kompanii-na-nashi-voprosi (accessed 10.07.2024) (in Russian).

[10] TASS. (2023). According to Siluanov, the share of settlements in national currencies between the Russian Federation and China leaves 90%. Retrieved from: https://tass.ru/ekonomika/19047493 (accessed 10.07.2024) (in Russian).

[11] Alekseevskih, A. (2024). The economist assessed the new anti-Russian sanctions. Retrieved from: https://www.gazeta.ru/business/news/2024/05/03/22925977.shtml (accessed 10.07.2024) (in Russian).

The main goals for Russian economy next six years on ensuring its competitiveness in the longer term have been formulated by the President of the Russian Federation V.V. Putin in Address to the Federal Assembly.

However, sanctions challenge the Russian economy; their addressing requires scientific approaches.

However, the United States does not intend to lose its global leadership. Therefore, economic sanctions against Russia will be imposed for at least 10-15 years. Indeed, dollar will continue to be the main global reserve currency. During this period, it is necessary to do a lot in the financial sphere. First of all, within the framework of cooperation between the BRICS countries, which serves as a platform for partnership of states with common interests in politics, economy and security coincide. We believe, it is necessary to introduce a common BRICS payment system in order to eliminate the dominance of the dollar in global settlements and link it with the national payment systems of the BRICS countries. It allows the BRICS members to ensure the growth of their economies and strengthen their competitiveness.

Secondly, the Russian economy should become a connecting logistics system to provide Russian competitiveness. Russian economy should make the Northern Sea Route (NSR) its main source in ensuring national economy competitiveness by reducing the delivery time of goods. The main alternative freight routes between East and West are longer and more dangerous than the NSR. For instance, the distance from Vladivostok, Russia to St. Petersburg, Russia through the Suez Canal is more than 23 thousand km, whereas along the NSR only 14 thousand km; from Yokohama, Japan to Murmansk, Russia – almost 24 thousand km against 10.7 thousand km. Furthermore, when transporting cargo, companies and operators face problems caused by the constantly tense political situation in the Suez Canal zone: Somali pirates, regional conflicts, shipping high cost, etc.[12].

Thirdly, import substitution in the Russian economy is objectively difficult today. Indeed, for quite a long time it was more profitable to import the necessary equipment, components, goods, developments and raw materials from abroad than to produce Russian analogues. Undoubtedly, the Russian economy is striving to secure its competitive position in the defense industry. Significant results have been achieved in agriculture. Russia built its own passenger aircraft MS-21. Major technological breakthroughs have been made in shipbuilding, including the construction of icebreakers. The first floating nuclear power plant "Akademik Lomonosov" has been built in Russia. Modern technological innovations from the defense industry are beginning to transfer into civilian sectors of the economy. The President of the Russian Federation V.V. Putin set the goal to increase the share of civilian products to at least 30% of the total production of the Russian military-industrial complex by 2025, and to 50% by 2030[13].

However, the industry is still largely now simply replacing products previously supplied by Western countries with products from China and other friendly countries through the intermediaries (parallel imports). Nowadays, the Chinese brands are actively developing the Russian passenger car market instead of German and French car models. However, we have few new domestic cars. The Moskvich brand was actively developing. Indeed, it is out to be uncompetitive among Russians in relation to numerous Chinese models. The modification of the Vaz Vesta car is equipped by Chinese upgraded 1.8 Evo engine and a 7-speed variator. Under these conditions, the United States is already influencing to countries friendly to Russia in order to ban the supply of certain goods to Russia. Moreover, on May 1, 2024, the US Treasury Department added 20 Chinese companies to the SDN list for their cooperation with Russia, etc.[14].

Therefore, ensuring the Russian economy competitiveness is an issue of its technological sovereignty. According to V.I. Matvienko, the Chairman of Russian Federation Council of the, today "another key issue

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[12] *Ecoship. (2024). Prospects of the Northern Sea Route Retrieved from: https://ecoshp.ru/blog/perspektivy-severnogo-morskogo-puti (accessed 10.07.2024) (in Russian).*

[13] *Trends. (2024). Technology transfer from the military to the civilian in terms of diversification was discussed in 2016 Retrieved from: https://trends.rbc.ru/trends/innovation/cmrm/62bc654a9a79472a6a3bdf70 ?from=copy (accessed 10.07.2024) (in Russian).*

[14] *Vedomosti. (2024). The large industrial China companies are under new US sanctions for ties with Russia. Retrieved from: https://www.vedomosti.ru/politics/articles/2024/05/03/1035243-chto-znachit-popadanie-krupnih-promishlennih-firm-knr-pod-novie-sanktsii-ssha (accessed 10.07.2024) (in Russian).*

will be the struggle for technological sovereignty"[15].

Indeed, under the Russian economy competitiveness in modern conditions of political and economic sanctions, we will understand its ability to ensure its self-sufficiency and independence in the world market, primarily through ensuring its technological and resource leadership and interaction with the BRICS member countries.

Undoubtedly, Russian organisations today have accumulated vast experience in competing with global brands during their presence in Russia. All industries should actively transfer to the production of goods and services on the territory of the Russian Federation.

Thirdly, training of specialists and engineering personnel necessary for Russian organisations is extremely relevant. Scientific and technological development and global competitiveness of any country depend on the level of engineering development; it is largely determined by higher education, primarily engineering one.

Unfortunately, there are problems with the management of Russian higher education today. According to Academician of the Russian Academy of Sciences R. Nigmatulin, "throughout history, academicians have worked in the Ministry of Education. Qualified people with a decent education. Nowadays they are replaced by managers and lawyers. They are not able to raise industry or establish education"[16]. Over the past 30 years, the training of students in Russian universities has been constantly "improved". However, it is manifested largely in the adoption of new Federal State Educational Standards of Higher Education. However, all these changes are concern with only the names of competencies and abstract abilities of students. Meanwhile, it is not appropriate to refer them as standards, as they do not provide a clear understanding of what and how students, as future specialists, should be trained to [7]. Currently, there is an idea to abandon the foreign model (Bologna Process) of higher education (Master's and Bachelor's degrees). Nevertheless, universities have been continuing to prepare bachelors. As a result, bachelors are not demanded by employers. Moreover, Federal State Educational Standards are not correlated with the needs of organisations [8].

Today, there is a need to create advanced engineering schools on the basis of the Russian universities. The goal of such schools is to train qualified personnel for high-tech knowledge-intensive sectors of the economy aimed at creating innovative developments and products. According to M. Kalmatsky, in regard to the instruction of the President of the Russian Federation V.V. Putin, in 2024, the number of advanced engineering schools based on Russian universities will grow from 30 up to 50. In the future, their number will be increased up to 100. Therefore, the domestic economy will be provided by specialists necessary to achieve country technological sovereignty[17]. Indeed, universities themselves should train the necessary professionals: technical universities must be inherently engineering schools. It is particularly relevant in conditions when Russian organisations are facing a growing "staff hunger", primarily in engineering personnel. It will increase as necessary to address new tasks to ensure the technological sovereignty of the Russian economy.

Currently, higher education today does not correspond to the goal of training the necessary specialists for Russian organisations, including engineers in specific sectors of the economy. At the same time, even the concept of "vocational education" has disappeared from the names of universities today. Simultaneously, many public higher education institutions are now focusing on commercial activities. They are trying to earn money. In practice, there are cases when state universities give up part of the budget places in favor of paid enrollment of students, as this gives them an instant economic effect.

As a result, the main criterion for hiring university graduates by employers, is not their bachelor's degree, but work experience, as a rule, at least 5 years; this experience often in not profile one. Russian employers do not understand what is bachelor; they tend to hire specialists or masters. As a result, the creative

[15] *Larina, A. (2022). Matvienko does not expect drastic changes in the structure of the new government. Retrieved from: https://www.kommersant.ru/doc/6664645 (accessed 10.07.2024) (in Russian).*

[16] *Iron, F. (2024). People in higher positions have no education. Academician Nigmatulin pointed out the weakest point of the current government Retrieved from: https://newsland.com/post/7723285-na-vysshih-postah-lyudi-bez-obrazovaniya-akademik-nigmatulin-ukazal-na-samoe-slaboe-mesto-nyneshney-vlasti (accessed 10.07.2024) (in Russian).*

[17] *Kalmackij, M. (2024). Russia is increasing the training of specialists to achieve technological sovereignty. Retrieved from: https://rg.ru/2024/04/03/konvejer-inzhenerov.html (accessed 10.07.2024) (in Russian).*

potential of young university graduates is not functioning to a proper extent in the interests of domestic organisations. Indeed, it is not used for ensuring the required level of Russian economic competitiveness. Perhaps, it is necessary to provide distribution to work in Russian organisations. It would strengthen the interaction between employers and universities. However, employers would be able to impose the necessary practical requirements for the professional training of university graduates; organisations would be provided by energetic, creative and active university graduates. It would ensure development and the necessary level of competitiveness.

Currently, the domestic science of organisation management contains a lot of foreign concepts without sufficient scientific justification Researchers manage everything: projects, risk, change, finance, innovation, quality and even real estate [8]. Moreover, researchers mainly consider the economic aspects of project implementation, product quality assurance, reduction of negative consequences of possible risks, acceptance of changes by employees of organisations, rational use of finances, etc. Today a number of Russian researchers often manipulate the concept of "management". That approach does not provide any tangible practical benefit to improve the efficiency of domestic organisations. Indeed, it introduces confusion related to practical implementation of modern managerial knowledge. According to B.G. Litvak, "there is no single conceptual framework in the numerous management literature" [9]. And primarily it refers to management of domestic organisations. Therefore, it is time to correlate national science concepts of organisation management with the practice. It should be considered in the training of university students as future managers. Moreover, it will contribute both to the competitiveness of domestic organisations and Russian economy. Effective organisation management theory and professional education are the basis for the successful national economic development and ensuring the required level of competitiveness.

Conclusions

Hence, the conclusions are as follows.

Firstly, the Russian economy is currently facing the challenge of ensuring its competitiveness in terms of global changes in the world economy, the US and EU countries sanctions pressure. It requires to ensure Russia self-sufficiency and technological sovereignty

Secondly, it is necessary to integrate into the global economy as a developed economy, including using the BRICS as the largest importer of resources and high-tech products. At the same time, the import substitution strategy should become a real mechanism for Russian economy development, including the echnologically advanced industries.

Thirdly, to ensure national sovereignty, it is necessary to accelerate the withdrawal of the Russian economy's dependence on the dollar.

Fourthly, there urgently needs to reconfigure higher education to train professionals. It allows organisations to provide themselves with the necessary personnel to work successfully in the current conditions of global economic development. It also provides the maximum use of university graduates potential to ensure their competitiveness.

Fifthly, it is necessary to establish the domestic theory of organisation management a basis for practical provision of effective activities of domestic organisations. It allows ones to implement the import substitution as a mechanism for ensuring self-sufficiency and technological sovereignty of the Russian economy in terms of modern challenges.

However, only the complex of measures allows ones to effectively address the challenges of providing the Russian economy with the required level of competitiveness. It is necessary to address these challenges in terms of strategic perspective. Nevertheless, the Russian economy has entered its development path and has a good chance of becoming one of the world's leading economies by 2050. Meanwhile, today it is important to maintain the time frame for timely addressing the challenges facing the Russian economy to ensure the required level of competitiveness in order to avoid the mistakes of the 1990s. As a result of them, we have to recover lost opportunities in economy development. Moreover, it requires a significant overspending of all kinds of resources, including finances.

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Analysis of the economic status and tourism management in Kazakhstan

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ORIGINAL ARTICLE

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Abstract. The article analyses the enhancement of tourism management in Kazakhstan. The research examines the current state of tourism industry management, identifies its challenges, and proposes possible solutions. The results will allow us to develop effective measures to improve the tourism industry in the country. The problem of the research is the need to analyse and improve tourism management in Kazakhstan. The objects of the research are the organisations and structures responsible for the development of tourism in Kazakhstan. The purpose of the research is to identify the main challenges in tourism management in Kazakhstan, propose recommendations and measures to increase the efficiency and competitiveness of the tourism sector. The results include an analysis of industry current state, key challenges of its development, and proposals to improve tourism management in Kazakhstan. These results can be used by government authorities, travel companies, and other stakeholders to implement tourism development strategies in the country.

Keywords: tourism management; economic status; Kazakhstan; development

Introduction

The purpose of the research is to assess the current state of the tourism industry in Kazakhstan, identify problematic aspects in tourism management resources, and develop recommendations for their solution.

Indeed, tourism is one of the key sectors of Kazakhstan economy. As a rule, tourism contributes to the development of regional economies, attracts foreign investment, provides new jobs, and improves the country's image worldwide.

The theoretical significance concerns with expansion of theoretical knowledge on tourism management, and establishing of a base for further scientific research in this field. Moreover, public authorities, travel companies, and entrepreneurs can implement research results to optimise the management of the tourism business and increase the competitiveness of the industry as a whole.

Literature review. The study of scientific literature allows us to identify understudied aspects in terms of the research field [2-7].

According to Livenets M.I. and Andreeva E.L.: «to determine the ways of ethnotourism development it is necessary, first of all, to correctly assess its potential. In combination with other types of tourism that can play a key role in both the development and promotion of regional brands» [2].

E. Kochkurova A. et al. consider the development of medical tourism. It involves design of new attributes of travel. It can be implemented through integrated approach to providing complex of medical and non-medical services. Each region should develop its own digital platform capable to support a tourist-patient at all stages of a medical tour, starting with awareness of the need (services with virtual medical tours), trip planning (recommendation services, personal accounts, applications for the formation of personal offers with the calendars of services availability, registers of medical organizations, medical personnel, and additional services)» [3].

Yashalov N.N. and Ruban D.A. suggest forest tourism to increase tourist attractiveness of Kazakhstan. Nowadays, there is an interest in various types of outdoor recreation. It is difficult to assess forest tourism due to absence of statistical information (primarily regarding unorganised tourists). However, the increase in the number of ecotropes and routes in the territories of state nature reserves and national parks in 2001-2020 from 550 to 1,520, the number of museums from 65 to 135, the number of visitor centers from 67 to 290 (Rosstat data), shows the sustainable development of environmental education and educational tourism, including forest tourism on the territory of the Russian Federation» [4].

According to Kotelevskaya Yu.V. and Osmanova E.U., in the new era of tourism development, population health and safety are of great importance. Personal experience, fear of changing entry rules, physical distancing and flexible rules for lifting restrictions determine demand in the short and medium term. Current trends in tourism development show the popularisation of environmentally friendly accommodation facilities. Tourists often choose hotels and inns taking care of nature; the most tourists are ready to overpay for «green» products and services [5].

Shigilcheva S.A., Zadorova T.V. and Stepanova A.N. consider rural (agrotourism) as one of the most sought-after areas among residents of Russia. This trend has begun to develop in Kazakhstan. On the one hand, this is a range of services, a demonstration of cultural traditions, and on the other hand, additional jobs, development of tourist infrastructure and conditions for a comfortable life in rural areas» [6].

Shchipanova D.G. et al. highlights the direct effect of tourism on the economy. It causes changes in production associated with the direct consequences of changes in tourist spending. For instance, an increase in the number of tourists directly increases sales in the hotel sector. Additional hotel sales and related wages and taxes are direct consequences of travel expenses [7].

Main part

We used graphs (Figures 1-7) and Table 1 to confirm the results and conclusions.

Figure 1 shows the indicator of Expenses per visitor in Kazakhstan increased significantly in 2015-2023.

An increase in the Expenses per visitor in 2015-2023 in Kazakhstan may have the following consequences for the economy and society:

Growth of the tourism sector: An increase in expenses per visitor can cause an increase in the total volume of country tourism market. This can contribute to the growth of the tourism industry, employment, and tourism revenues.

Infrastructure development: The increase in tourist expenses requires the development of infrastructure adapted to the needs of visitors. It can result in investment in tourism infrastructure, new services and improved quality of facilities.
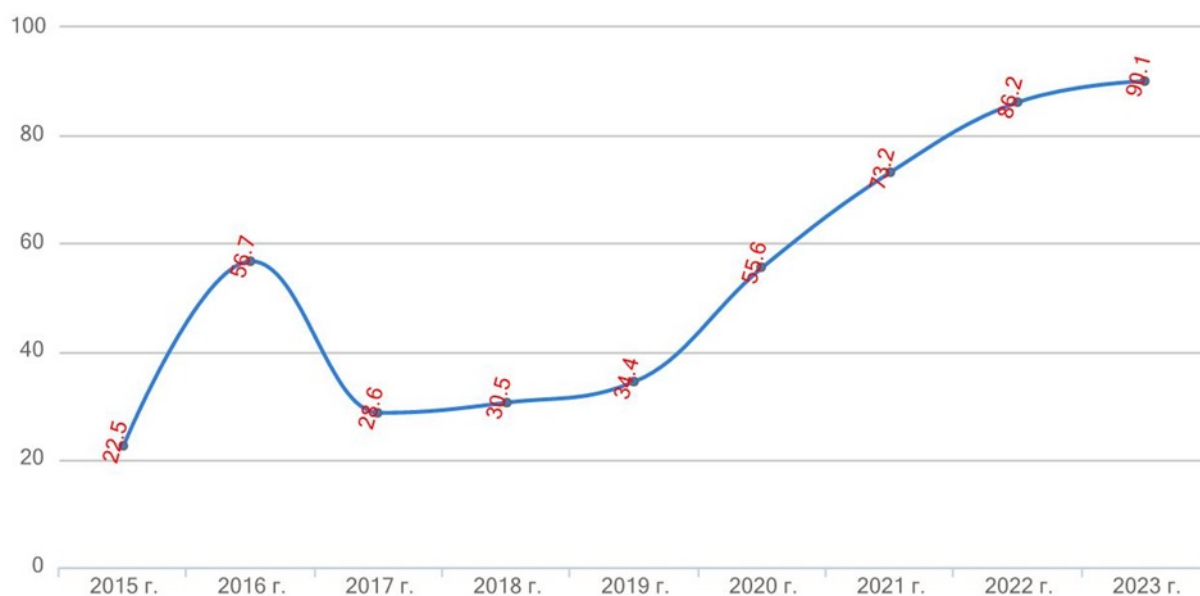
Figure 1. Dynamics of the indicator Expenses per visitor

Source: [1]

Increase in personal income: Increased visitor expenses can help to raise the income of residents in the tourism sector. High tourist expenses can increase the demand for goods and services in various sectors of the economy, resulting in higher personal income.

Growth in foreign exchange revenues: An additional expenses per visitor can also contribute to an increase in a country's foreign exchange revenues. It will have a positive impact on foreign economic activity and the stability of the national currency.

Enhancement of country's prestige: An increase in the tourist expenses can help to enhance the image and prestige of Kazakhstan. It will attract more visitors and investments.

Therefore, an increase in the indicator of Expenses per visitor in Kazakhstan can provide many positive consequences for its economy and society. It contributes to tourism growth, infrastructure development, increasing the population's income, and the country's prestige on the world stage.

Figure 2. Dynamics of the indicator Visitors total expenses

Source: [1]

Figure 2 shows the indicator of Visitors total expenses in Kazakhstan significantly decreased in 2023 compared to the period 2016-2022 [1].
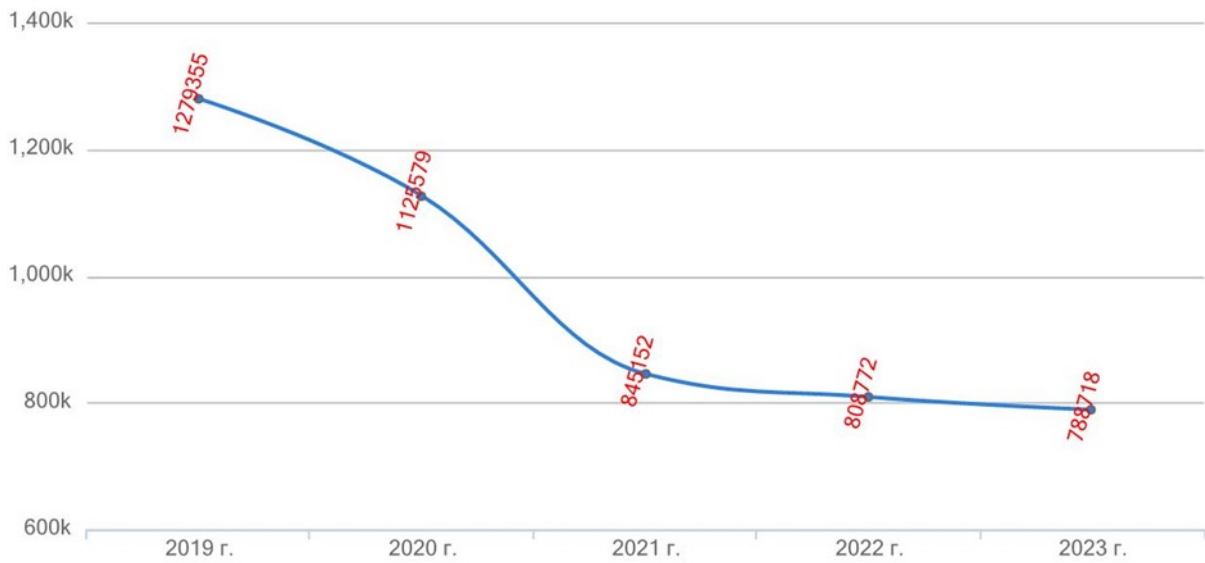
Figure 3. Dynamics of the indicator Number of visitors (household members) staying in fee-based accommodation (with the exception of sanatoriums)

Source: [1]

Figure 3 shows the number of visitors (household members) staying in fee-based accommodation (with the exception of sanatoriums) significantly decreased in Kazakhstan in 2019-2023.
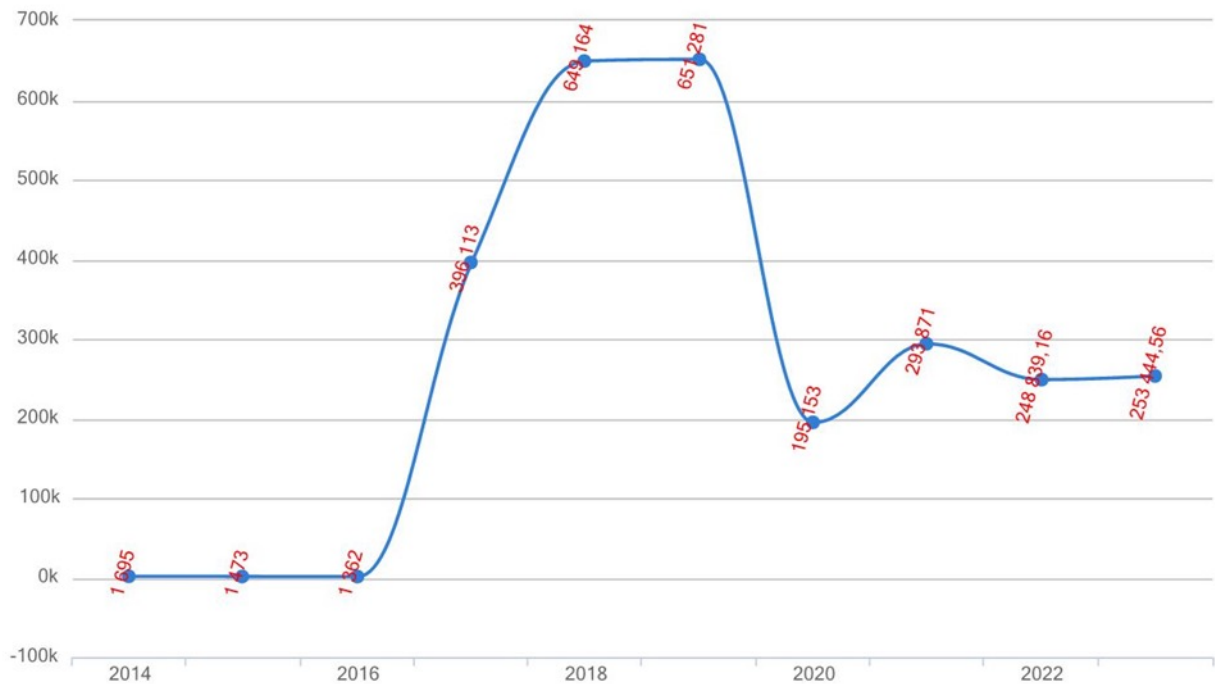
Figure 4. Dynamics of the indicator Number of visitors (household members) served by travel agencies
Source: [1]

Figure 4 shows the number of visitors (household members) served by travel agencies in Kazakhstan in 2020-2023 significantly decreased compared to the period 2017-2019.

Figure 5 shows the number of visitors (household members) served by travel agencies in the city of Astana and the regions: Karaganda, Pavlodar, and West Kazakhstan regions. In other regions and cities of Kazakhstan the number of visitors (household members) served by travel agencies is significantly lower.
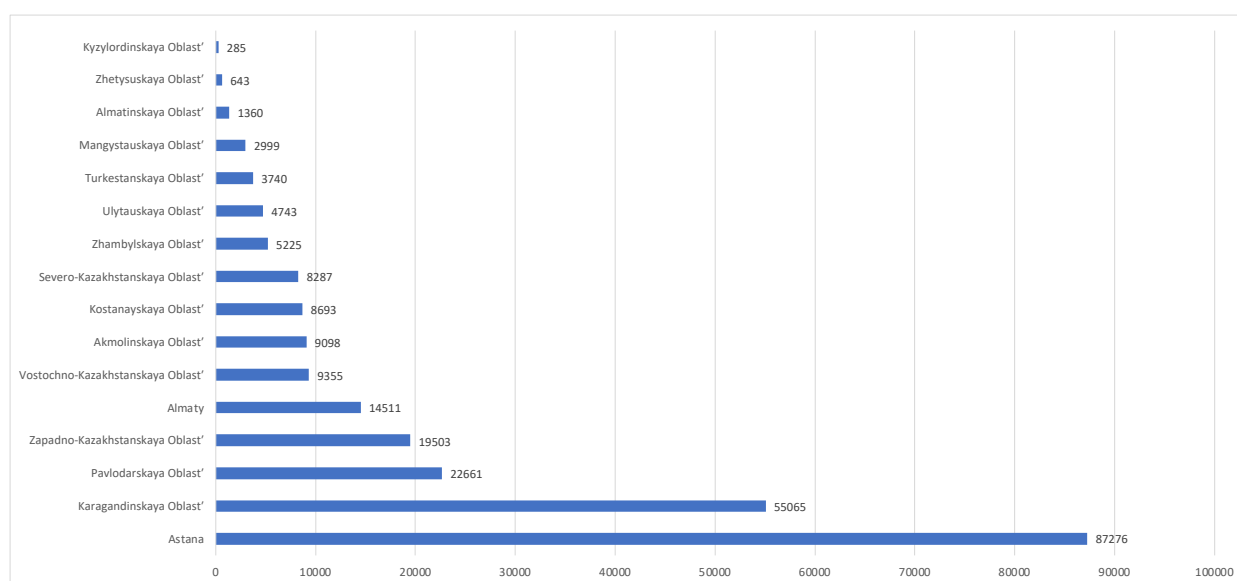
Figure 5. The number of visitors (household members) served by travel agencies in the regions and cities of Astana and Almaty

Source: [1]

Key indicators
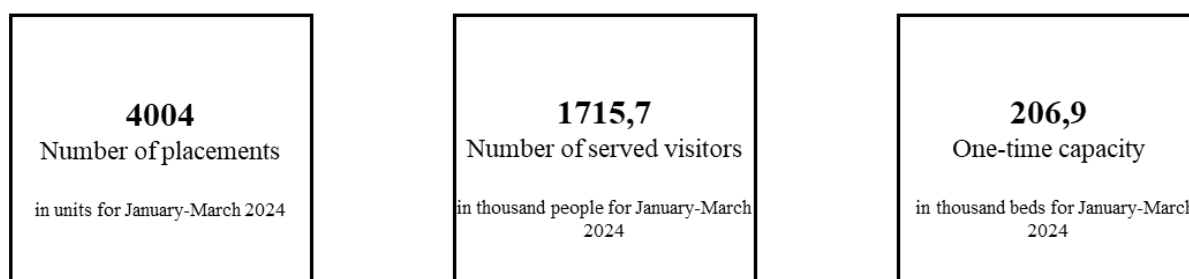
Figure 6. The number of placements, visitors served, the one-time capacity for January-March 2024

Source: [1]

Table 1 – Visitors served by type of tourism in the Republic of Kazakhstan, 2023 (thousand people)

	Incoming tourism	International tourism	Domestic tourism
Total	10, 523.7[1)	9, 204.2[1)	9,569.7
among them			
accomodatoin[2)	-	1,084.8	7,054.5
sanatorium-resort organisations[3)	-	0.8	412.6
specially protected territories [4)	-	323.3	2,102.6

[1)Data of the Border Service of the National Security Committee of the Republic of Kazakhstan

[2)Data of the National Statistical Observation on the form 2-tourism «Report on the Activities of Accommodation Facilities»

[3) Data of the National Statistical Observation on form 1-sanatorium «Report on Sanatorium and Resort Activities»

[4) Assessment on the data of the Departmental Statistical Observation of the Committee of Forestry and Wildlife of the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan on the form 1 of the protected area «Accounting of Specially Protected Natural Territories»

Source: [1]

According to Table 1, the number of visitors served by types of tourism in the Republic of Kazakhstan in 2023 for international tourism is more than for incoming and domestic ones.

Figure 7. The cost of the tourist package of the Republic of Kazakhstan, 2017-2023
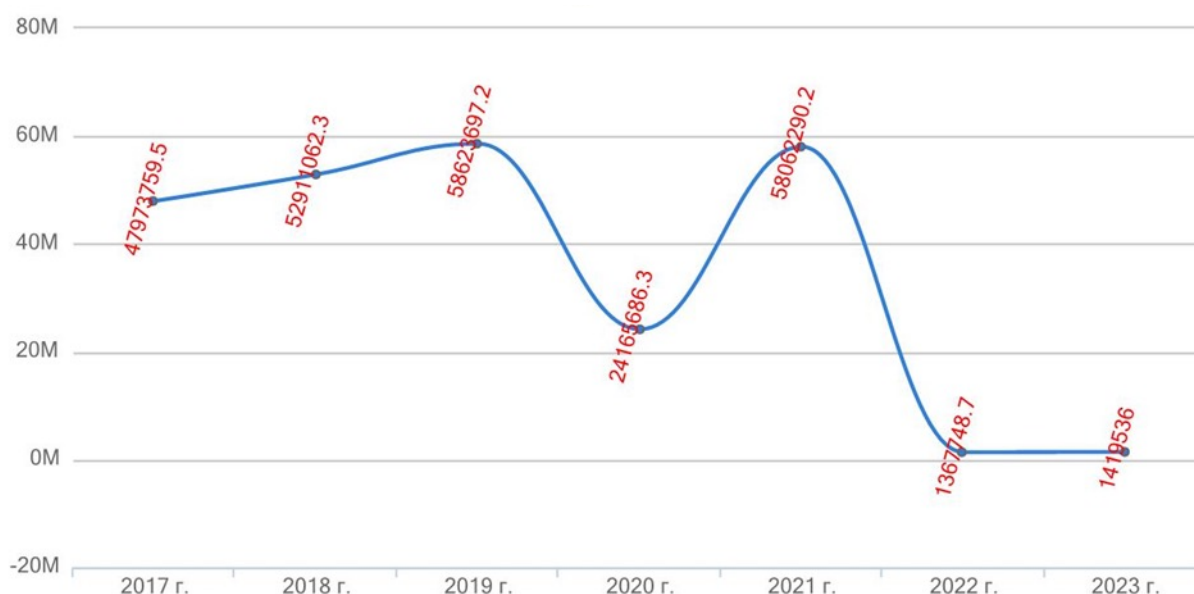
Source: [1]

By Figure 7, in 2022 and 2023, the cost of the tourist package of the Republic of Kazakhstan significantly decreased compared to the period 2017-2021.

The main challenges of the economic state and tourism management in Kazakhstan are as follows:

1. Reducing overall visitors spending. Despite the increase in expenses per tourist, the total amount of expenses in 2023 decreased significantly. It indicates decline in the total number of tourists or tourist trips.

2. Reducing the number of visitors staying in fee-based accommodation. In 2019-2023, the number of visitors staying at fee-based accommodation decreased significantly. It indicates a decline in demand for the services of hotels and other fee-based accommodation facilities.

3. Reducing demand for the services of travel agencies. In 2020-2023 there is a decrease in the number of tourists served by travel agencies. It may be due to the COVID-19 pandemic.

4. Regional disparity in tourist services. The greatest activity of travel agencies is in Astana, Karaganda, Pavlodar, and West Kazakhstan regions. However, in other regions the number of tourists is significantly lower. It provides an imbalance in tourism infrastructure development.

5. The excess of incoming tourism over international and domestic ones. In 2023, the number of incoming tourists served exceeded the indicators of international and domestic tourism. Indeed, people in Kazakhstan prefer travelling abroad more than within the country.

6. Reducing the cost of travel packages. In 2022 and 2023, there was a growth in the cost of travel packages compared to 2017-2021. It may indicate a decrease in prices for travel services, or a change in offered travel products structure.

The main factors influencing the economic conditions and tourism management are as follows:

1. The COVID-19 pandemic. It had a significant impact on the tourism industry, especially in the period 2020-2021. It reduced the number of both domestic and international trips.

2. Economic conditions. An increase in expenses per visitor may concern with inflation and growth of service costs. However, a decrease in the total number of tourists and expenses may indicate a weak economy and declining of population income level in general.

3. Infrastructural imbalances. Imbalanced development of tourism infrastructure and services across Kazakhstan's regions limits opportunities to attract tourists to less developed regions.

4. Low attractiveness of domestic and incoming tourism. The predominance of international tourism may indicate a low competitiveness of the tourism industry in Kazakhstan in comparison with foreign

countries.

5. Lower prices for travel products. The decrease in the cost of travel packages can be both a consequence of a decrease in demand and a strategy to retain customers through price competition.

6. Changing consumer preferences. A decrease in interest in traditional forms of tourism (accommodation in fee-based accommodation, travel agency services, etc.) may indicate an increase in the popularity of independent travel and alternative types of recreation.

Recommendations for improving the economic conditions and tourism management in Kazakhstan are as follows:

Domestic tourism promotion. To compensate the decrease in the total costs of visitors, there is a need to develop domestic tourism intensively. Therefore, to stimulate travel within the country, it is necessary to provide the state programs to popularise domestic tourist destinations, organise events and promotions for residents of Kazakhstan.

Improving the quality of fee-based accommodation. A decrease in the number of visitors staying at fee-based accommodation may indicate their low quality or high prices. Therefore, it is necessary to improve service standards, introduce flexible tariffs, and promote alternative forms of accommodation (glamping, agrotourism, ecotourism, etc.).

The development of digital services and independent travel. As the number of visitors served by travel agencies decreases, it is necessary to develop online platforms. Those will allow tourists to plan and book trips on their own. Travel companies should adapt to the visitors demand by offering specialised and unique tours for small groups of tourists.

Balanced regional development. To reduce the disparity in attendance in different regions, it is necessary to invest in the development of less popular areas' infrastructure. It may include repairing roads, developing air links, building new hotels, and developing regional tourist routes currently visited by fewer tourists.

Support for incoming tourism. To reduce the imbalance between incoming and international tourism, Kazakhstan should to be actively promoted as an international touristic country. Moreover, to attract tourists from other countries, it is relevant to develop the country's brand, participate in international exhibitions, organise information tours for foreign journalists and bloggers, improve visa policy, etc.

Price competitiveness. The decrease in the cost of tourist packages in 2022 and 2023 indicates the urgency of revising the pricing policy. Indeed, to attract tourists, it is necessary to develop competitive offers in terms of price and quality of tourist services. It may include flexible discount systems and all-inclusive packages.

Support programs for tour operators. The decline in the number of tourists served by travel agencies requires a review of their role in the market. It is necessary to develop government programs to support and train tour operators, encouraging them to offer more diverse and innovative services meeting the needs of tourists.

The development of specific types of tourism. To increase interest in the country, it is necessary to develop ecological, cultural, historical, sports, and wellness types of tourism. It will help to attract specific target audiences and increase the number of both domestic and international tourists.

Development of a national tourism strategy. It is necessary to develop a long-term national tourism strategy in terms of current trends and challenges. This strategy should include sustainable development to attract investors to the tourism industry and minimise tourism environmental impact.

Conclusion

The increase in expenses per visitor did not compensate for the overall decrease in visitors' expenses. It indicates a tendency to reduce the total number of tourists or tourist trips, despite the increase in the cost per tourist.

The overall decline in the number of visitors staying in fee-based accommodation (except sanatoriums) may indicate a decrease in interest in traditional forms of tourism and the choice of alternative accommodation options (for example, short-term rental housing through platforms, i.e. Airbnb).

The decrease in the number of tourists served by travel agencies in 2020-2023 shows a possible change in tourist preferences.

The greatest number of tourists is in several large regions. It indicates a regional imbalance in the development of tourist infrastructure and services in other regions.

International tourism prevails over domestic and incoming ones. It indicates low competitiveness level of tourist offers within the country and low interest of foreign tourists in Kazakhstan.

The decrease in the cost of travel packages in 2022-2023 may indicate an attempt to adapt to a decrease in demand made by tour operators. It may also indicate a decrease in the solvency of the population or economic difficulties.

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.
Gaukhar B. Sakhanova – supervision.
Zhanay J. Abitov – investigation.
Diana Z. Abitova – formal analysis.
Amina M. Uristembek– validation.

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Assessment of Russian economic growth potential in 2024-2030

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ORIGINAL ARTICLE

Abstract. The Russian economy faced serious problems: a shortage of labour; economic sanctions, and high depreciation of fixed capital. The economic policy of the Russian authorities is inconsistent. It includes the desire to increase investments in fixed capital is accompanied by their artificial restraint through monetary and financial policies. Indeed, the scientific literature makes various proposals for economic policy changes. However, we believe the insufficient attention is paid to the objective possibilities of accelerating the renewal of fixed capital. The purpose of the study is to determine the growth opportunities of the Russian economy in 2024-2030 on the basis of accelerating fixed capital renovation. We used methods of mathematical statistics and simulation modelling. Information research base: official statistics. We constructed two objectively possible trajectories of the Russian economy development for 2023-2030 have been constructed in terms of accelerating fixed capital renovation. According to the research, the trajectory with a higher rate of capital renewal provides a significant acceleration of economic development and significantly reduces the country's dependence on equipment imports and exports of raw materials, even with a reduction in the total number of employees. To realize the potential of economic growth, changes in property relations, effective management system are necessary; their essence is in the formation of national economic planning through indicative planning, foreign trade, currency regulation, and nationalisation of management.

Introduction

Recently, Russia has faced an increasing shortage of labour[1]. Under the current economic policy, it does not allow ones to increase and maintain the low rates of economic growth. An increase in the number of migrant workers provides only a short-term improvement; it does not provide an increase in labour productivity – the main factor of economic development. In addition, labour immigration causes escalating of social issues, the growth of crime, and ethnic tension. The situation is aggravated by the high depreciation of fixed assets in most economic sector. It manifested, for example, in serious accidents at infrastructure facilities; the continuing tangible dependence of the economy on technology raw materials imports and exports; sanctions imposed by the United States and its satellites; resources for the Special Military Operation (SMO) in Ukraine.

The material basis for overcoming the obstacles in development of our country can only be the rapid renovation of production technical base.

The purpose of the study is to identify objective opportunities and ways to accelerate the technical re-equipment of the Russian economy and assess its effect.

Theoretical framework

Addressing the problem of production modernisation in economic literature is associated primarily with an increase in fixed capital investment. It can be achieved in various ways, including: changing the

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depreciation policy[2]; profit taxation [1; 7]; cancellation of the tax manoeuvre[3]; monetary policy [2]; targeted lending at a reduced interest rate[4]; public-private partnership[5]; attraction of foreign capital [3; 4]; use of the industrial development funds[6]; increasing the volume of lending to SMEs [5]; activation of budgetary policy without increasing taxes [6], etc.

As a rule, one of the main reasons for the slow renovation of fixed capital is considered to be the shortage of companies' capital [8].

In this regard, in 2018, when the share of investments in fixed assets amounted to 17.3% of GDP, the Government of the Russian Federation approved a plan to increase this indicator up to 25% in 2020-2022[7]. However, in 2020-2022, the share of investments in fixed assets in GDP decreased to 14-15% [9].

Moreover, governmental financial block limited the volume of investments in the national economy in accordance with the «budget rule» and measures against inflation through a high interest rate. There is an opinion on independent position of the Central Bank in stimulation of the economic growth [10]. In addition, according to the Central Bank's management, due to the «overheating» of the economy, expressed in an increase in labour shortages, increased investment will only cause the inflation[8].

In this regard, a there is a discussion on the expediency of attracting migrant workers[9].

A number of authors consider the resumption of the growth of Russian exports as a source of funds for the budget and investments [11]. However, the «budget rule» prevents the use of these funds as investments. However, SMO made the government had to break this «rule» to ensure the armed forces.

Import substitution is often considered the most important condition for a technological breakthrough [12]. However, a reduction of imports, with the same or growing exports, inevitably causes an increase in the current account and capital outflow, i.e. causes a reduction of investments in the country's economy. Also, there is an opinion that import substitution, as a rule, is less effective than import itself [13].

The most of authors develop recommendations within the framework of the current system of economy state regulation based on the neoclassical theory of state indirect impact on the market of final goods and services. The other researchers believe the practical use of strategic planning[10] [14-15]; the transition to a mobilization economy [16-17]; the «Stalinist model» of the economy [18-19] as ways of addressing.

However, these proposals concern with a further increase in the role of the state in the economy. Therefore, many authors see negative aspects in them[11]. According to scientific literature, the state, being the «private property of the bureaucracy costs an ordinary Russian citizen prohibitively expensive, without any real help from the state» [20].

Currently, there is a need to renovate the fixed assets. Indeed, a few researchers consider it an effective one. In our opinion, the most comprehensive assessment provided by the Siberian Branch of the Russian

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[3] *Valery Hartung on importance to cancel the tax maneuver March 10, 2022. (2024). Retrieved from: https://spravedlivo.ru/11899310 (accessed 20.07.2024) (in Russian).*

[4] *Glazyev, S. (2024). Monetary containment of Russia. Retrieved from: https://www.youtube.com/watch?v=OyjKRxp3Pf0 (accessed 20.07.2024).*

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[7] *The government approved a plan to accelerate the growth rate of investments in fixed assets and increase their share in GDP to 25% (2024). Retrieved from: http://government.ru/news/35925/ (accessed 20.08.2024) (in Russian).*

[8] *E. Nabiullina assessed the overheating of the Russian economy. (2024). RBC. Finance. Retrieved from: https://www.rbc.ru/finances /07/06/2024/66632ef59a7947dfc40c0b09 (accessed 20.08.2024).*

[9] *Degotkova, I. (2023). Experts argued about the benefits of attracting migrants to Russia. RBC Group of Companies. News. 10/25/2023. Retrieved from: https://www.rbc.ru/rbcfreenews/66745dac9a79470a53da1c77 (accessed 20.08.2024) (in Russian).*

[10] *Glazyev, S. Yu. (2024). The program of socio-economic development of Russia. Social Justice and Economic Growth, 2024. Retrieved from: https://www.glazev.ru (accessed 20.08.2024) (in Russian).*

[11] *Pronko Yu. (2024). Do officials not care about people? Kickbacks only! TC Tsargrad, 06/21/2024. Retrieved from: https://tsargrad. tv/shows/pronko-chinovnikam-plevat-na-ljudej-glavnoe-otkaty-2_1017718 (accessed 20.08.2024) (in Russian).*

Academy of Sciences and Novosibirsk State University[12]. According to their calculations, the renewal of fixed assets in accordance with the normative service life would allow ones to raise the rate of economic growth up to 6% per year. Indeed, it would be necessary to increase investments in fixed assets by 1.5 times, which is impossible yet. During SWO in 2023, the share of investments in GDP increased to only 15% [21].

According to these points of view analysis, nowadays there is no theoretical and practical basis for interpreting the shortage of labour as a reason both for increasing the importation of migrant workers into the country and for limiting investments in the economy.

The expansion of migrant labour using (except expats) will basically only allow us to load and further operate, but not update, the existing equipment. It will give a one-time increase in output, but will not increase labour productivity. For instance, to achieve an increase in GDP by 1%, it is necessary to attract more than 700 thousand migrants. For annual increase of 4%, almost 3 million foreign workers should be imported annually. It will inevitably cause an aggravation of social issues, increase in crime, and ethnic tension.

The main direction of increasing labour productivity is the improvement of the instruments of labour. Indeed, it is possible to increase labour productivity by increasing employees qualifications. However, increase in labour productivity limited by the technology itself when it remains the same.

To address the issue of productivity growth and labour shortage, it requires updating the instruments of labour themselves. Therefore, the restriction of capital investments allows ones only to realise the short-term benefit of capital owners in using cheap labour instead of updating fixed capital. Indeed, it prevents the economy from the crisis.

The basis for addressing the issue of labour shortage (labour productivity growth) is the renewal of labour resources in existing organizations. It is the replacement of machines parts with new ones, or the installation of new equipment on the site, workshop, or enterprise. As a result, labour productivity is increasing and the need for labour is decreasing. Upgrading existing equipment has less effect in terms of reducing the need for workers, since the old equipment remains, although labour productivity increases. Transferring of workers between enterprises in order to increase employment with more efficient instruments of labour is limited. It provides spontaneous competition for workers between organizations and only exacerbates the problem.

It takes from several months to 1-2 years to replace the old equipment with the new one; the same time is necessary for the training of personnel to work on new equipment.

On the basis of reducing the need for labour reduces the shortage of personnel, appeared the prerequisites for workers' employment in newly created industries, including the production of instruments of labour.

Usually, the renovation of fixed capital is associated with the possibilities of monetary investments of business entities. But its renovation does not require money; it requires renovation of instruments of labour only. They can be manufactured domestically or imported. Currently, both sources are in use. However, they do not ensure proper renewal of fixed capital. It provides a high level of its depreciation, including the level of labour productivity [9].

To accelerate the process of fixed capital renewal, it is necessary to increase the inflow of new labour assets into the economy to replace deteriorated ones, both through domestic production and imports. Therefore, there is a need firstly rapidly increase the import of investment goods – primarily for the re-equipment and expansion of domestic production of labour instruments (in fields of mechanical engineering and industrial construction) and industries supplying it with the necessary material resources and services. Then, based on an increase in the output of labour instruments, proceed to reduce their imports and turn the country into a net exporter of equipment.

Import substitution will not provide a rapid increase in the equipment influx, since it is aimed at reducing imports of machinery. The domestic production of machinery development along with increase in its import, will dramatically increase this influx and subsequently accelerate import substitution.

Approximately according to this logic, the technical reconstruction of the Soviet economy during the

[12] Baranov, A. O., & Kvaktun, M. I. (2024). Forecasting accelerated renewal of fixed assets in Russia using a dynamic cross–industry model. Retrieved from: https://ecfor.ru/publication/prognoz-obnovleniya-osnovnogo-kapitala-v-rossii (accessed 20.07.2024) (in Russian).

first five-year plans was provided [22]. Nowadays, the same paradigm should be implemented in order to achieve national technological independence of the country.

Today, as in the years of industrialisation, our country is under the sanctions. Purchasing of new equipment is significantly complicated. To purchase the necessary equipment, there is a practice of using parallel imports, copying technologies, barter, digital currencies, and other import substitution schemes. In complex, it ensures national security in the context of a «hybrid war» [23]. Previously, the Soviet Union and the People's Republic of China are copying equipment and components. Subsequently, they successfully addressed with technological sovereignty achievement.

First of all, it requires the import of the necessary highly efficient equipment have not been producing domestically. In the future, its production should also be established, including through its copying and modernisation.

In case the import of equipment that is the most efficient is absolutely impossible, it will help to design the competitive products. Firstly, it is necessary to modernise and expand the machine tool industry, revive it on the basis of imported and the best domestic equipment, in order to build machinery based on it.

For types of equipment need to be produced domestically and imported at the same time, equal conditions of competition should be created. The protectionist measures should be applied to ensure national production development.

There are objective opportunities for a significant increase in imports of investment goods. They are as follows:

– current account funds (see Table 1);

– the Russian Federation international reserves (on August 16, 2024 amounted to $ 609.9 bn USD)[13]. Despite about $300 bn USD of reserves are frozen by Western banks, the amount of available reserves exceeds about $ 130 bn USD can be used for import purchases without any threats to foreign trade continuity.

– replacing part of the import of less important goods; their production can be easily established domestically by small businesses (fasteners, accessories, underwear, toys, etc.).

Table 1 – Some indicators of Russia's foreign economic activity (USD, bn)

Period	2020	2021	2022	2023	7 months of 2024
Current account positions, eop[14]	37.35	124.95	237.68	50.22	39.7
Import of investment goods	60.74	88.16	now	now	now

Sourcs: [9]

Therefore, there are objective opportunities for a significant increase in imports of machinery to provide domestic engineering and related industries growth.

It is necessary to assess their implementation using and determine the methodology for intended effect assessment.

Methods

The basis for assessing the effect of renewal, a 4-sector model of the intersectoral balance was used. It simulates the development of the Russian economy in 2005-2019 [24]; data by Rosstat [9], the Ministry of Finance[15], and the Bank of Russia[16], methods of correlation and regression analysis, simulation modelling

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[13] *Bank of Russia. (2024). Retrieved from: https://www.cbr.ru/ (accessed 20.08.2024) (in Russian).*

[14] *CBR. (2024). Statistical Bulletin of the Bank of Russia. Retrieved from: http://www.cbr.ru/statistics/bbs/ (accessed: 20.08.2024) (in Russian).*

[15] *The Ministry of Finance of the Russian Federation. (2024). Statistics Retrieved from: https://minfin.gov.ru/ru/statistics/ (accessed 20.08.2024) (in Russian).*

[16] *CBR. (2024). Statistical Bulletin of the Bank of Russia. Retrieved from: http://www.cbr.ru/statistics/bbs/ (accessed: 20.08.2024) (in*

were used.

The model is as follows. The sectors of the model concern with all types of economic activity differ from each other in the economic purposes:

– production of instruments of labour (sector 1);
– overhauling and reconstruction of instrument of labour (sector 2);
– production of consumer goods and final services (sector 3);
– intermediate non-production services (sector 4).

Sector 1 includes: agriculture, forestry, hunting, fishing, and fish farming; extractive industries; partially: manufacturing, production and distribution of electricity, gas, and water; construction (maintenance of buildings and structures), trade; freight transport, i.e. activities the results of which are used by economic entities and relate to the material costs.

Mechanical engineering and construction are partially attributed to sector 2. Two main subsectors are identified: 2a) Establishing of new instruments of labour; 2b) Overhauling and reconstruction of instruments of labour

Sector 3 partially includes: manufacturing; production, and distribution of electricity, gas, and water (for the population); construction (housing), transport (passenger), communications, trade and repairs (in terms of public services), hotel activities, catering; other services (public administration, social security, education, healthcare, etc.)

Sector 4. It includes: financial activities, real estate, rental services (including science).

Using the methods of mathematical statistics for each sector, the dependences of labour productivity, material consumption of products, unit costs of intermediate consumption, and labour stock ratio when working in one shift on the share of newly introduced funds in the existing fixed assets were estimated.

The statistical significance of the dependencies was verified using models based on the dynamics of output, material costs, intermediate consumption, and the volume of funds. It is quite high. In most cases, the correlation coefficients of the simulated and actual dynamics of the indicators is 0.97-0.99; the lowest one is 0.83; the standard deviations did not exceed 1%.

The correlation between sectors is a system of following balance:

1) production and use of sector 1 products;
2) production and use of instruments of labour;
3) instruments of labour overhaul and reconstruction works;
4) intermediate services of a non-productive nature;
5) labour force.

The model also includes the usual balance of fixed assets by sector, indicators of value added, and final consumption.

The main control variables in the model are as follows: the volume of input and retirement of fixed assets; the number of employed in sectors; the degree of utilization of production capacities; the volume of foreign trade in investment, intermediate and consumer goods; the size of international reserves; the unemployment rate.

Exogenous values are considered to be indicators of the total number of employees, net factor income, and net current transfers.

Based on the described model, balanced growth trajectories objectively possible in 2005-2019 were constructed. According to them, Russia would become a net exporter of production equipment and a significant increase in economic growth rates without increasing exports of raw materials and employed [24].

The described model was also used to assess the effect of various options for updating fixed assets in the Russian economy for 2024-2030. Moreover, the previously established dependencies of economic activity indicators by the sectors on the share of newly introduced fixed assets in the existing fixed capital remain. All calculations are in the basic prices of 2023.

In terms of the hybrid war, a component was allocated as part of the final product to provide the armed

Russian).

forces, including: production of weapons, including fixed assets (equipment) – the result of the work of sector 2; and material resources (ammunition) – part of the products of sector 1; consumer goods and services (uniforms, food, etc.), which are supplied by Sector 3.

Military costs of the Russian Federation budget in 2023 were 6,652.0 bn RUB; in 2024 – 10,737.0 bn RUB[17]. The employed in the armed forces is 2,209.1 thousand people[18].

Two possible trajectories of the Russian economy development for 2024-2030 were calculated:

1) inertial – while maintaining the parameters of renewal of fixed capital and foreign economic activity developed over the previous period;

2) with the accelerated renewal of fixed capital due to the initial increase in imports of investment goods and the subsequent transition to its reduction based on the rise in domestic production of instruments of labour.

Prerequisites:

1) When constructing an inertial trajectory:

– maintaining the renewal and retirement ratios of fixed assets typical for recent years, including for sector 1: 5.4% and 0.5%, respectively; sector 2: 8.0% and 0.5%, respectively; sector 3: 3.0% and 0.5%, respectively; sector 4: 3.7% and 0.8%, respectively.

– Maintaining net exports at the average level of recent years, including intermediate goods in 18,574.3 bn RUB; investment goods: 7,166.5 bn RUB; consumer goods and services: 4,139.4 bn RUB.

– Maintaining the same structure of the employed by sector.

– Maintaining the value of the current account at the level of 2023, i.e. 4,278.1 bn RUB.

– An increase in arms production by 3 times in 2025 compared to 2023; stabilisation at this level; an annual increase in the provision of the armed forces with consumer goods and services by 6% per year – by 1.5 times in 2030.

2) When constructing a trajectory with accelerated renewal of fixed assets:

– the use of part of the international reserves accumulated in 2023 for import purchases – 11,898 bn RUB in 2023 prices (approximately $ 132.2 bn USD). Maintaining those in the future at an average of $ 175 bn USD.

– The expenditure of current account funds for the import of goods per year 4,278.1 bn RUB (about $ 47.5 bn USD).

– Increasing the coefficients of renewal and retirement of fixed assets in economic sectors due to the import of investment goods and accelerating the growth of instruments of labour.

– An increase in arms production in 2025 compared to 2023 by 3.77 times, followed by an annual growth of 6% per year; in 2030 – an increase of 5 times compared to 2023; an increase in the provision of the armed forces with consumer goods and services in 2025 – by 2.27 times, then by 6% in a year, in 2030 – 1.5 times (as in the previous case).

A common prerequisite for both trajectories: annual reductions in total employment – 100,000 in 2024 and 150,000 each year thereafter.

This is due to a significant natural decrease in the population and a tendency to decrease the migration influx.

Indeed, the natural decrease for 2022 was 543.4 thousand people; for 2023 – 438.3 thousand people; for 5 months of 2024 – 281.8 thousand people (For the same period of 2023 – 236.8 thousand people) The migration increase for 5 months of 2023 was 109.7 thousand people; for 5 months of 2024 – 58.7 thousand people. The total population of Russia in January: May 2024 decreased by 223.1 thousand people.

However, the number of people employed in the Russian economy in the first half of 2024 was slightly higher than in the first half of the previous year. Indeed, it was due to reducing the unemployed and increasing the number of people participating in the SMO in Ukraine.

[17] *Duma. (2024). Federal Budget 2024-2026: basic figures. Retrieved from: http://duma.gov.ru/news/58339/ (accessed 20.08.2024) (in Russian).*

[18] *TASS. (2024). How the staffing of the Armed Forces of the Russian Federation changed. Retrieved from https://tass.ru/info/19436809 (accessed 20.08.2024) (in Russian).*

The year 2023 was taken as the starting point for both trajectories. The main indicators of the Russian economy are shown in Table 2.

Table 2 – Performance indicators of economic sectors in 2023

	Sectors					Total
	1	2a	2b	3	4	
Fixed assets at the beginning of the year, bn RUB	216,692.5	6,590.5	1,957.5	152,582.3	49,578.6	427,401
Fixed assets at the end of the year, bn RUB	231,395.8	7,037.7	2,090.3	162,935.5	52,942.6	456,402
Employment, thousand people	24,435.2	3,802	1,129.2	38,860.8	5,372.8	73,600
Intermediate consumption, bn RUB	69,638.2	10,358.3	3076.6	55,158.5	7,792.8	146,024.4
Newly introduced funds, bn RUB	12,281.8	566.5	168.3	6,109.4	1,868.5	20,994.5
Retired fixed assets, bn RUB	1,300.2	39.6	11.7	915.5	297.5	2,564.4
Output, bn RUB	125,474.9	13,828	4,106.9	116,107.7	42,465.2	30,1982.7
Material costs, bn RUB	47,178	7,781.6	2,311.3	40,472.2	5,816.2	103,559.4

Source: calculated on the basis of [21; 25]

Results

Each trajectory included assessment by year for 2024-2030 by the following indicators:

– by economy sectors: the volume of input and disposal of fixed assets; their availability at the beginning and end of the year;

– average annual number of employed persons; output; intermediate consumption; material costs; value added; net exports; increase in product stocks (for sectors 1 and 3); labour productivity, material consumption of products, the degree of utilisation of production capacities, and a number of other indicators;

– for the economy as a whole: gross value added; final consumption, including and without including military costs; gross output; employment summary indicators

The indicators of the inertial trajectory assessed in terms of the assumptions above. Calculations of trajectory indicators with accelerated renewal of fixed assets characterised by higher rates of input and retirement of fixed assets; an increase in imports of labour in the early years is due to the use of international reserves and current account funds. Then the volume of imports of instruments of labour decreases, and their net exports indicators become positive ones. Therefore, net exports of raw materials and supplies are declining.

Additionally, this trajectory assumes an annual increase in the cost of training and encouraging employees to work on new equipment – 687-772 bn RUB. It depends on the share of new equipment in the fixed capital at the beginning of the year. To meet these costs, imports of consumer goods and services are increasing in the same volume. It is provided by the expense of international reserves and the current account. In total, to increase imports of labour and consumer goods and services, it is planned to allocate international reserves by 11,700 bn RUB; annual use of current account funds is 4,278.1 bn RUB.

Moreover, the volume of necessary goods imports is important in terms of the trajectory of accelerated renewal of fixed assets. In case of insufficient funds in the current account or an unforeseen significant reduction in the volume of international reserves, they can be secured by reducing imports of less significant goods and services.)

The trajectory of accelerated fixed capital renewal is supposed firstly to focus on accelerating the growth of the production of instruments of labour (sector 2a), and later on accelerating the growth of consumer sector 3.

The differences in the indicators of reproduction of fixed capital between the trajectories are shown in Table 3.

Table 3 – Indicators of fixed assets reproduction for 2023-2030 with inertial (I) and accelerated (Y) options for updating fixed assets

Indicator	Average renewal rate, %		Average retirement rate, %		The share of retired fixed assets in the volume of fixed assets at the beginning of 2023		The share of introduced fixed assets in the volume of fixed assets at the end of 2030		Growth in the volume of fixed assets at the end of the year, times	
Option	I	Y	I	Y	I	Y	I	Y	I	Y
Sector 1	4.3	5.9	0.5	5.0	4.7	41.4	30.4	45.9	1.30	1.07
Sector 2	7.6	15.1	0.5	6.0	5.4	74.0	46.7	85.5	1.72	1.89
Sector 3	3.0	6.3	0.5	3.0	4.4	27.2	21.3	44.8	1.19	1.28
Sector 4	2.2	6.3	0.8	2.9	6.3	20.5	16.9	44.6	1.09	1.27
The economy	3.7	6.4	0.05	4.0	4.9	29.6	26.4	46.7	1.25	1.19

Source: composed by the author

By the table, under accelerated fixed capital renewal, the share of funds introduced in 2023-2030 in fixed capital at the end of 2030 (46.7%) is much higher than under inertial renewal (26.4%). The share of funds withdrawn during this period in the volume of funds at the beginning of 2023 under the accelerated version is also higher: 29.6% versus 4.9%. The growth of the total volume of fixed assets in the accelerated version (1.19 times) is less than in the inertial version (1.25), but they are more updated and their load factor is higher.

The renewal of fixed assets in sector 2 is faster. The share of capital aged 0-8 years in funds at the end of 2030 is 85.5%; in 2023-2030 74.0% of funds used in 2023 were eliminated. In the inertial version, the corresponding figures are 46.7 and 5.4%. In other sectors, the rate of renewal of fixed capital is approximately the same, but significantly higher with the accelerated version than with the inertial one.

The results of accelerating the renewal of fixed assets affected the growth indicators (see Table 4).

Table 4 – Assessment of economic growth indicators for 2023-2030 in accordance with inertial (I) and accelerated (Y) options for updating fixed assets

Indicator (bn RUB)	Growth over the period, times		Average annual growth, %	
	Option I	Option Y	Option I	Option Y
Output, sector 1	1.117	1.191	1.016	1.025
Output, sector 2	1.218	2.702	1.029	1.153
Output, sector 3	1.251	1.418	1.033	1.051
Output, sector 4	1.266	1.548	1.034	1.064
Total output	1.216	1.452	1.028	1.055
Employment, sector 1	0.912	0.906	0.987	0.986
Employment, sector 2	0.942	1.666	0.992	1.076
Employment, sector 3	1.026	0.939	1.004	0.991
Employment, sector 4	1.090	1.024	1.012	1.003
Employment, total	0.986	0.986	0.998	0.998

Indicator (bn RUB)	Growth over the period, times		Average annual growth, %	
	Option I	Option Y	Option I	Option Y
Final consumption, including military costs	1.283	1.448	1.036	1.054
Final consumption without military costs	1.276	1.455	1.035	1.055
Gross value added	1.281	1.615	1.036	1.071
Production of military equipment	3.000	5.000	1.170	1.258
Total military costs	2.153	3.022	1.116	1.171
Labour productivity by value added	1.224	1.638	1.029	1.073

Source: composed by the author

Therefore, the acceleration of the renewal of fixed assets has significantly increased all growth indicators of both sectors and the economy as a whole. The difference in the dynamics of growth in gross value added, as the final source of all income in the country, is shown in figure 1.
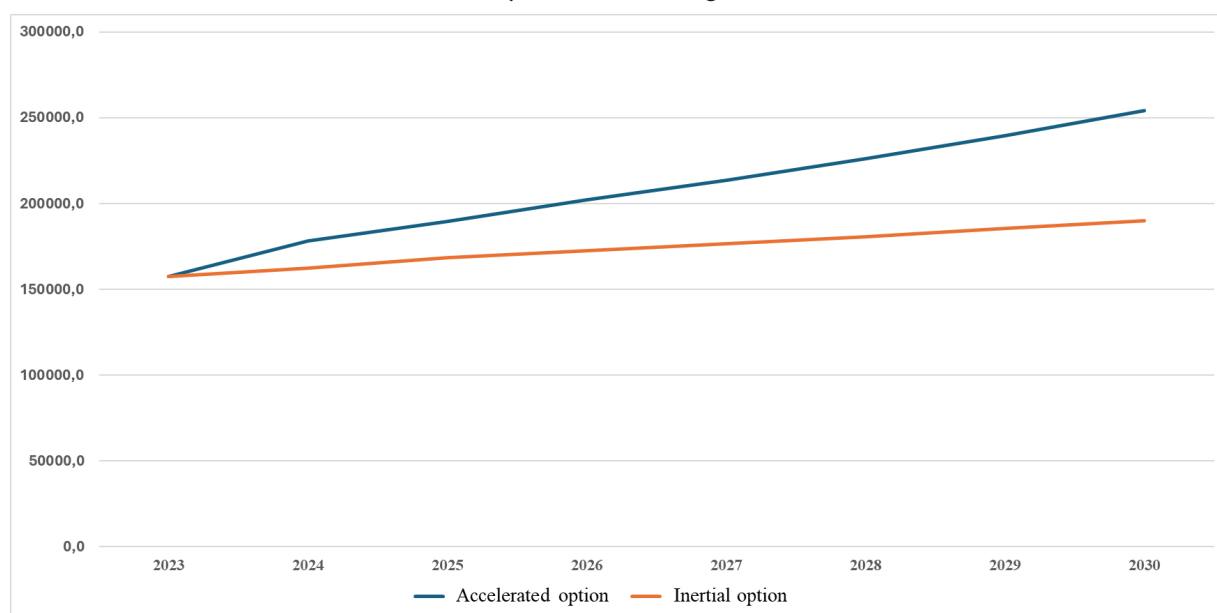
Figure 1. Dynamics of gross value added under the inertial and accelerated option of updating fixed capital, in basic prices of 2023, bn RUB

Source: composed by the author

The accelerated option of updating fixed capital allows the state to finance the military forces in large volumes, while final consumption, excluding military costs, will also increase faster than with the inertial option (Fig. 2 and 3).

However, using the accelerated option of updating fixed capital reduces the Russian economy dependence on the import of instruments of labour. According to Figure 4, Russia could become a net exporter of investment goods by 2030.

Additionally, the accelerated version reduces the dependence of the Russian economy on the export of raw materials (see Figure 5)

Due to the acceleration of the renewal of fixed assets, starting from 2027, there is a decrease in net exports of intermediate goods with a constant increase in their domestic use. Continuing the same course, Russia could become a zero net exporter of these resources in 2031, and a net importer thereafter. Meanwhile, production in sector 1 will be higher than under the inertial variant (see Table 4).
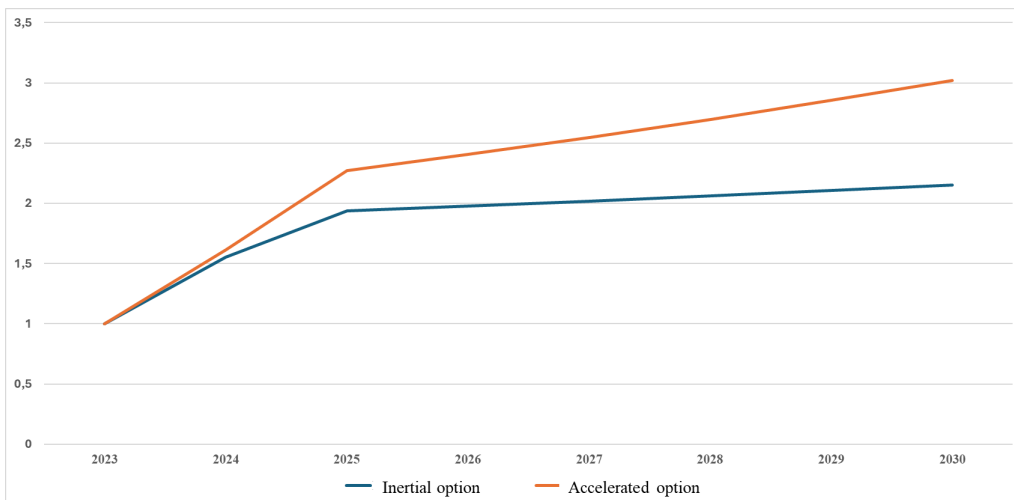
Figure 2. Growth in output of products and services for military purposes with inertial and accelerated options for updating fixed assets, times

Source: composed by the author

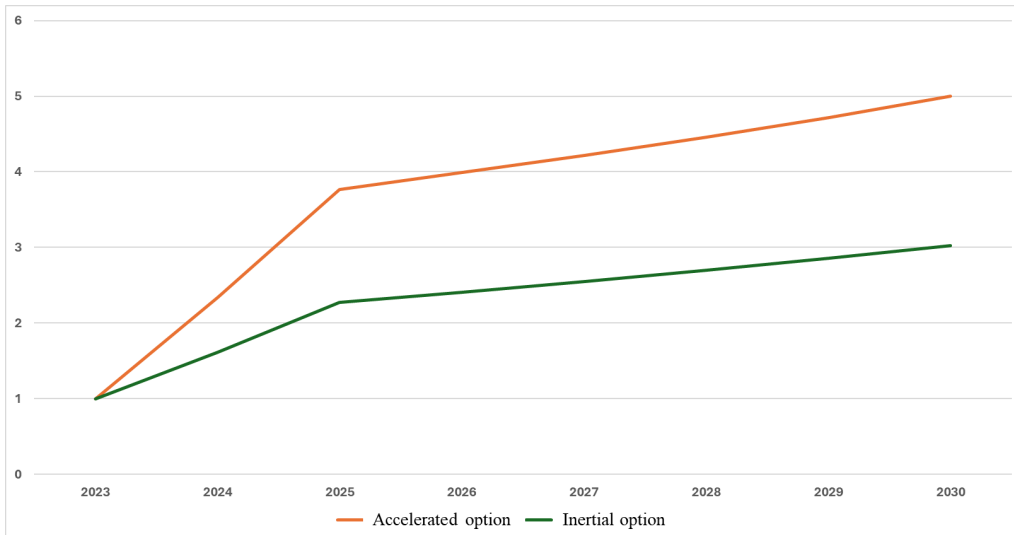**Figure 3.** Growth in the output of military equipment and ammunition with inertial and accelerated options for updating fixed assets, times
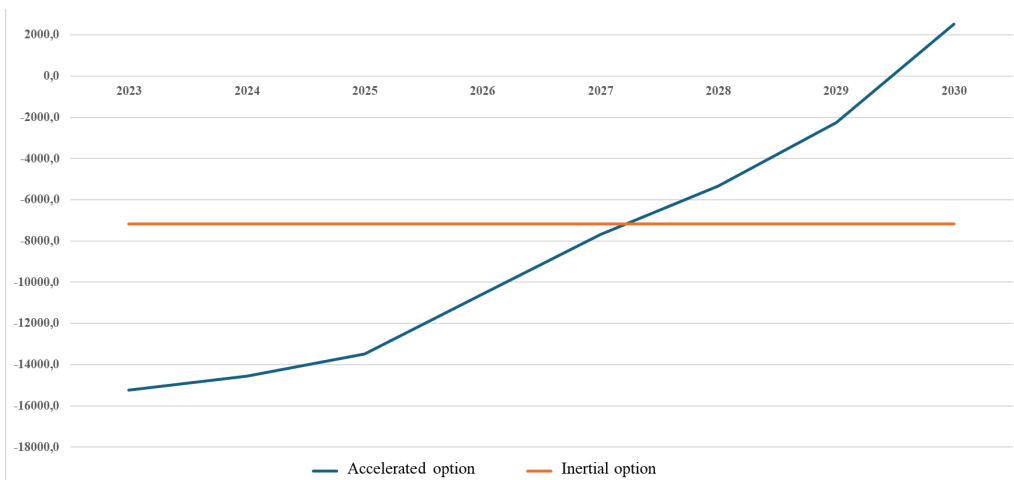
Source: composed by the author

Figure 4. Dynamics of the volume of net exports of investment goods with accelerated and inertial options for updating fixed assets, at basic prices in 2023, bn RUB

Source: composed by the author

Figure 5. Dynamics of the volume of net exports of investment goods with accelerated and inertial options for updating fixed assets, at basic prices in 2023, bn RUB

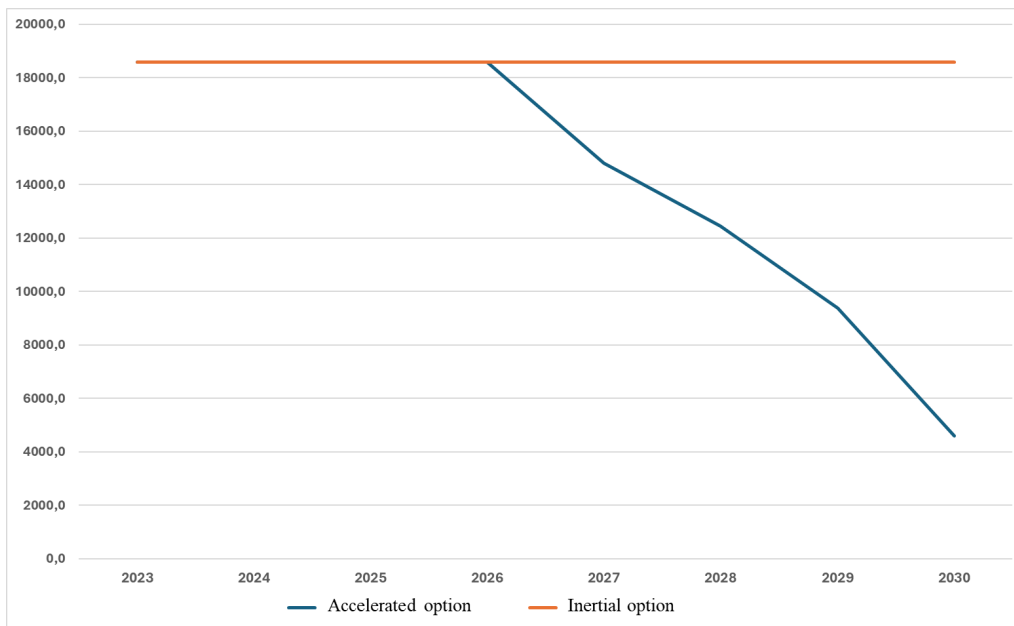*Source: composed by the author*

The use of accelerated renewal of fixed capital significantly changes economy structure (see Table 5).

Table 5 – Assessment of indicators of economy structure by sectors in 2024 with inertial (I) and accelerated (Y) options for updating fixed capital, %

Option	I	Y	I	Y	I	Y	I	Y
Indicator	Employed		Added value		Output		Fixed assets at the end of the year	
Sector 1	31.8	30.5	31.8	25	37.3	33.3	53.5	45.1
Sector 2	6.4	11.5	3.3	17.6	5.8	10.8	2.9	3.5
Sector 3	53	50.5	41.8	36.2	42.5	41.2	33.7	38.7
Sector 4	8.8	7.6	23.1	21.2	14.3	14.7	10	12.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: composed by the author

The role of sector 2 (production of instruments of labour) is increasing. The role of other sectors is generally decreasing, especially of sector 1 (intermediate goods production). Meanwhile, output in all sectors is growing at a higher rate than the inertial variant.

Hence, the acceleration of the renewal of fixed capital can significantly accelerate the development of the economy, improve its structure, reduce dependence on the export of raw materials and import of equipment, decrease shortage of labour resources, an increase the utilisation of production capacities.

Discussion

Indeed, both of these trajectories are not the only possible ones, since they are built on certain prerequisites. Nevertheless, the acceleration of the renewal of fixed capital significantly increases the pace of economic growth and allows ones to decrease the shortage of labour, the dependence of the economy on imports of machinery and exports of raw materials. Moreover, the faster the technical base of production is updated, the faster is the process itself.

Meanwhile, it is obvious the limits of acceleration of fixed assets renewal determined by the effective service life of the instruments of labour, the possibility of importing goods, the need to ensure full employment, etc. Therefore, the rate of renewal of fixed capital should not exceed the reasonable limits. The update speed in

the accelerated update trajectory constructed above is not the maximum one; it may be increased.

Furthermore, it is possible to use the increase in the production of labour inputs domestically rather than for export, as suggested in the constructed trajectory. For instance, the machinery produced can be used to accelerate the renewal of fixed capital in economic sectors, increasing their development rate. The choice of method of utilisation of instruments of labour growing volume is determined by economic policy itself.

Building an accelerated renewal trajectory emphasised the movement and growth in efficiency of the economy outputs. There is an abstraction from value in the form of money circulation. Indeed, money circulation is assumed to merely serve the movement of consumer values. Otherwise, the goal was to improve output, increase labour productivity, and reduce the resource intensity of products and services. This development goal, as it shown by the experience of the USSR's development until the mid-1950s, presupposes the predominance of public rather than private ownership of the means of production.

The current slow development of the Russian economy is a consequence of the focus of economic activity on the growth of profit (surplus value), rather than the available opportunities for country development. It resulted in the predominant growth of raw materials and materials-producing industries, the decline of machine-building and other industries producing finished goods, capital outflow, low investment in fixed capital, slow renewal at many enterprises, and a growing shortage of labour (a resource cheaper for capital than new machinery).

Objective opportunities to accelerate the renewal of fixed capital and overall economic growth were in previous decades and are available now. However, they are not being implemented and unlikely to be implemented while maintaining the current system of economy state regulation. They are expressing mainly the interests of the bourgeois class, primarily export-oriented capital.

The most complete utilisation of the available potential for economic growth requires a transition to a socialist society based on the predominance of public ownership of the instruments of labour and a government. It correlates with the fundamental interests of the most employees.

However, changes, accelerating economic growth, are also possible in the economic system of modern Russia. They are justified by scientific literature [18]. Their essence is in strengthening the state influence on economic processes through indicative national economic planning, foreign trade and currency regulation, stimulating monetary and financial policy, nationalisation of the most important enterprises and even industries of the economy, etc. The governmental influence on the economic processes is also should be strengthened.

Particularly, the equipment imports should be centralised to ensure the national interests. However, it is associated with the currency from exports distribution. It is distributing through special industries (primarily to raw materials, metallurgy, chemical industry). Otherwise, the renewal and increase of fixed assets is primarily needed in machine-building and other import-competing industries.

Accounting for the existing differences in the profitability of enterprises and industries, only the state is able to redistribute currency for the purchase of necessary equipment abroad. For example, to provide it through the mandatory sale of foreign currency proceeds. Certainly, the centralised import of machinery should be based on enterprises requests; those should fulfil the state assignments for the development of production. Equipment purchased by the state can be leased to enterprises to achieve specific results, establish new production facilities. Enterprises should be financially responsible for fulfilling their obligations to the state.

The government only can establish new enterprises in industries with a long payback period of capital investments. Their development is necessary for ensuring the national security. Only the government is able to organise personnel training and subsequent distribution of trained employees.

The situation in the Russian economy clearly shows that Russia's capitalism is an inhibitor of the country's development. Fundamental changes are overdue both in property relations and in the system of government and management.

Conclusion

The basis for addressing the main challenges of the Russian economy labour shortage (growth of labour productivity), dependence on imported equipment and export of raw materials) is the renewal of the instruments of labour in existing enterprises.

To accelerate the process of fixed capital renewal, it is necessary to increase the inflow of new labour assets into the economy to replace deteriorated ones, both through domestic production and imports. Therefore, there is a need firstly rapidly increase the import of investment goods – primarily for the re-equipment and expansion of domestic production of labour instruments (in fields of mechanical engineering and industrial construction) and industries supplying it with the necessary material resources and services. Then, based on an increase in the output of labour instruments, proceed to reduce their imports and turn the country into a net exporter of equipment.

Import substitution will not provide a rapid increase in the equipment influx, since it is aimed at reducing imports of machinery. The domestic production of machinery development along with increase in its import, will dramatically increase this influx and subsequently accelerate import substitution.

There are objective opportunities for a significant increase in imports of investment goods. They are as follows:

– current account funds;

– international reserves of the Russian Federation;

– replacement of less important goods imports (their production could be provided domestically) by imports of necessary equipment and components.

To assess the effect of accelerating fixed capital renewal, we used a 4-sector inter-industry balance model constructed on the basis of statistical data for 2005-2019.

We have compiled two possible trajectories of Russia economic development for 2024-2030. They are as follows: inertial one includes preservation of the existing parameters of fixed capital renewal; with accelerated renewal of fixed capital due to the initial increase in imports of investment goods and subsequent transition to its reduction due to domestic production.

According to calculations, accelerated renewal of fixed capital will result in slower growth of total fixed assets. Indeed, they are renewed rapidly and their utilisation rate is higher. Fixed capital renewal is particularly rapid in the sector involving the production, modernisation and overhaul of fixed assets.

Indeed, the acceleration of the renewal of fixed capital significantly increases the pace of economic growth and allows ones to decrease the shortage of labour, the dependence of the economy on imports of machinery and exports of raw materials. Moreover, the faster the technical base of production is updated, the faster is the process itself.

However, there are limits to accelerating the renewal of fixed assets. Therefore, the rate of renewal of fixed capital should not exceed the reasonable limits.

The current slow development of the Russian economy is a consequence of the focus of economic activity on the growth of profit (surplus value), rather than the available opportunities for country development.

A transition to a socialist society is required to fully utilise the available potential for economic growth. Moreover, reforms, accelerating the economic growth, are also possible in Russia current economic system. Their essence is in strengthening the state influence on economic processes through indicative national economic planning, foreign trade and currency regulation, stimulating monetary and financial policy, nationalisation of the most important enterprises and even industries of the economy, etc. The governmental influence on the economic processes is also should be strengthened.

Specifically, imports of machinery should be centralised to renew fixed capital in machine building and other import-competing industries.

The situation in the Russian economy clearly shows that Russia's capitalism is an inhibitor of the country's development. Fundamental changes are overdue both in property relations and in the system of government and management.

The research results correlate with the issues of social reproduction and state economic policy in Russia.

Research prospects are in detailing simulation models of the Russian economy for constructing

development trajectories for the future and making recommendations on reforming the Russian economic system.

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CONFLICT OF INTEREST
The author declares no conflict of interest.

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Applied aspects of Russian regions ESG-transformation

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ORIGINAL ARTICLE

Abstract. The development and implementation of regional ratings/rankings by Russian rating agencies, universities or sustainable ESG development companies contribute to the improvement of Russian national statistics on sustainable development. Rating agencies use different methods in compiling ESG ratings. Consequently, the same regions can rank different positions with the same initial data. Therefore, there is a need of unified methodological approach. It allows ones to assess the parameters of regional sustainable development and ESG transformation, measure the level of sustainability and determine the trends of their sustainable development. In this article, we will analyze the three most popular ESG ratings of Russian regions. The paper presents the results of the ESG rating/ranking of the Central Federal District regions, the Russian Federation. The main 3 analytical methods are as follows: The National Rating Agency, the RAEX rating Consortium, and the Center for Sustainable Development and ESG Transformation at the Moscow State Institute of International Relations (MGIMO). The ranking of regions according to the methodology of the National Rating Agency and the RAEX rating group considers components E, S, and G; MGIMO 2023 methodology considers Sustainable Development Goals within clusters (economic, environmental, social, and institutional ones). According to the research, there is a necessity to enhance the Sustainable Development Goals indicators in order to improve the position of the particular Central Federal District region.

Keywords: sustainable development; regions ESG transformation; ESG ratings/rankings of regions; sustainable development goals; recommendations of regional authorities

Introduction

The Russian scientific literature dwells on the ESG agenda in the development of regions and the institutional environment for supporting regional ESG transformation, establishment of their best practices, occurrence of leading and outsider regions, etc. [3]. Theoretical aspects of ESG modernization of regions and regional economy are being developed [4].

Ratings and rankings in the field of ecology, social policy, and management (ESG) are becoming increasingly popular; they show the degree of ESG transformation principles in the activities of regions. There are a lot of foreign countries ratings: S&P Global ESG Evaluation, ESG Risk Ratings, Bloomberg ESG Disclosure, MSCI ESG Rating, ISS ESG Corporate, FTSE Russell's ESG Ratings, CDP (Carbon Disclosure Project), RepRisk Rating, Moody's ESG Solution, Refinitiv, etc. [7]. At the beginning of 2024, there is no single methodology in Russia; the existing ratings of Russian regions on the SD and ESG agenda presented by different number of rating indicators:

– the SBER regional ESG rating index includes 16 factors; it is based on more than 80 indicators obtained in terms of special requests from the group to regional public authorities;

– the RAEX rating consortium includes 29 indicators;

– the rating of the Center for Sustainable Development and ESG Transformation at MGIMO includes 169 indicators grouped for each of the Sustainable Development Goals (SDGs);

– the rating of the National Rating Agency (NRA) includes 45 indicators divided into three key blocks: E-block (environment, ecology) – 14 indicators, S-block (social policy) – 17 indicators, G-block (quality management) – 14 indicators.

There are many regional ratings and rankings according to individual indicators and areas of regional assessment: the rating of investment attractiveness of Russian regions (RAEX); the rating of the Russian Federation regions on the level of public-private partnership development (Ministry of Economic Development of the Russian Federation); the rating of regions for achieving national goals (Consortium Leontief Center AV Group); the rating of regional efforts executive authorities assessment to establish a high-quality environment for citizens lives (Agency for Strategic Initiatives), etc. There are social, environmental, and managerial indicators in the Decree of the President of the Russian Federation «On Assessment the Effectiveness of Senior Officials (Heads of Supreme Executives) of the Regions of the Russian Federation and the Activities of Executive Authorities of the Russian Federation» (2021) [13].

The ratings are of practical importance for the development of regional sustainable development strategies. The MGIMO Center for Sustainable Development and ESG Transformation concluded the relevance of involving experts in analytical work on determining indicators of regions sustainable development: specialists of regional authorities, universities, businesses, volunteering groups, etc. Their proposals can be included in roadmaps and provided for legislative initiatives, research projects, the establishment of centers of interaction between the state and business, increasing public initiative, and control over the implementation of the goals and objectives of the sustainable development strategy [15].

According to M. Trachenko, the level of the regional ESG rating is an important guideline for regional authorities; its increasing is one of the priorities of their activity. Therefore, the effective implementation of a regional ESG policy is an important factor in attracting investments and subsidies. The benefits of the region are savings on debt servicing, attracting public funds to reimburse the cost of infrastructure and new facilities development, special investment contracts to stimulate industrial investments, etc. [10, p. 93].

Domestic scientific publications analyse the ESG ratings of individual regions [7] or conduct a comparative analysis of regions in terms of Federal Districts – Volga [6], Ural [12], Far Eastern ones [5], etc. For instance, S. Nikonorov and P. Bogomazov propose using the polar index in respect to the regions of the Russian Arctic as an alternative/addition to ESG ratings [8].

In 2023, the first ESG ranking was presented for 23 regions, and the largest cities of the Eurasian Economic Union countries. It was prepared by the Department of Investment and Industrial Policy of Moscow and the National Rating Agency. The top five are Moscow and St. Petersburg (Russia), Mogilev region (Belarus), Alma-Ata region (Kazakhstan) and Minsk (Belarus). The Republic of Tatarstan, and the Rostov Region (Russia) also have the indicators above the median value [1].

Scientific publications on ESG regional ratings concern with improving the methodological support of the ESG approach [11], the methodology for assessment and ensuring the reliability of information [7], urgency to expand the use of ESG ratings of Russian rating agencies in the domestic regulatory framework by analogy with credit ratings, and providing wider use of national ratings to stimulate ESG activity of Russian business.

The Report of the Research Institute of the Higher School of Economics (HSE) highlights the shortcomings of international ESG ratings in respect to companies as follows:

– a high Subjectivity Level (SL) in terms of the indicators choice, their aggregation, and assessment;

– ESG ratings are consistent in 6 out of 10 cases; there is a weak correlation between the ratings, which distinguishes ESG ratings from credit ones coincide in 99% of cases;

– voluntary reporting on SL and ESG presented by companies allows them to present themselves advantageously and manipulate the information disclosure process [20, pp. 10-11].

According to T. Altufyeva, there is negative relationship between the levels of ESG and regional economic development (on the examples of the Republics of Tatarstan and Bashkortostan) and the necessity to improve the indicators for assessing the ESG transformation of regions in block G. The author notes the expansion of the ESG indicator system and suggests the following:

– to increase the number of indicators for assessing the quality management (Governance block) in comparison with the indicators used by the rating agency RAEX;

– expand the number of indicators (the Economy block) to the integrated ESEG system; maintain the

predominance of the environmental and social blocks over the economic one. Moreover, in the context of the current economic sanctions against Russia, the author suggests to select an appropriate financial indicator showing the degree of the region's economy availability to eliminate the shock effect and restore the economic proportions of the territory for each risk-oriented economic indicator [2, p. 128].

However, N. Perekrest and O. Zatepyakin note the absence of a unified methodological approach in assessing the degree of sustainable development and implementation of the ESG agenda in the regions. Moreover, the rating agencies use different methods in their compilation. As a result, the same regions may be in different positions with the same initial data [9]. Indeed, we will conclude this later in our research. In this article, we will analyze the three most popular ESG ratings of Russian regions.

Methods

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; it is also uses the special research methods: the method of economic publications content analysis, statistical one, etc. The main source of information was the data of the national ESG ratings and rankings of the Russian Federation regions.

The objects of the study were the regions of the Central Federal District. In some aspects the information is detailed for the Vladimir, Ivanovo, and Yaroslavl regions.

Results

Analysis of three ESG ratings of Russian regions data:
– National Rating Agency [14],
– the RAEX Rating Consortium [17; 18; 19],
– The Center for Sustainable Development and ESG Transformation at the Moscow State Institute of International Relations (MGIMO) – MGIMO'2023 [15].

Rating No. 1. The regional ESG rating of the National Rating Agency identifies 5 levels: advanced, developed, moderate, developing, and initial one. The following statuses have been assigned to the regions of the Central Federal District:
– advanced level (5 regions of the Russian Federation) – Moscow city, Belgorod, Moscow, Kaluga, Kursk regions;
– developed level (4 regions of the Russian Federation) – Voronezh, Tula, Lipetsk, Tambov regions;
– moderate level (4 regions of the Russian Federation) – Oryol, Bryansk, Yaroslavl, Ryazan regions;
– developing level (3 regions of the Russian Federation) – Kostroma, Vladimir, Smolensk regions;
– initial level (2 regions of the Russian Federation) – Tver and Ivanovo regions (Table 1).

Table 1 – Results of regional ESG rating of the Central Federal District presented by the National Rating Agency (NRA)

Rank / Region of the Russian Federation	Index	Level	Index		
			E	S	G
1. Moscow city	0.781	advanced	0.714	0.794	0.833
2. Belgorod region	0.702	advanced	0.679	0.735	0.692
3. Moscow region	0.648	advanced	0.643	0.647	0.654
4. Kaluga region	0.611	advanced	0.571	0.529	0.731
5. Kursk region	0.604	advanced	0.607	0.588	0.615
6. Voronezh region	0.600	developed	0.643	0.618	0.538
7. Tula region	0.575	developed	0.714	0.588	0.423
8. Lipetsk region	0.568	developed	0.571	0.441	0.692
9. Tambov region	0.560	developed	0.536	0.529	0.615
10. Oryol region	0.543	moderate	0.607	0.559	0.462

Rank / Region of the Russian Federation	Index	Level	Index		
			E	S	G
11. Bryansk region	0.543	moderate	0.679	0.559	0.462
12. Yaroslavl region	0.518	moderate	0.536	0.441	0.577
13. Ryazan region	0.504	moderate	0.607	0.559	0.346
14. Kostroma region	0.483	developing	0.393	0.441	0.615
15. Vladimir region	0.460	developing	0.429	0.529	0.423
16. Smolensk region	0.460	developing	0.536	0.382	0.462
17. Tver region	0.419	initial	0.393	0.441	0.423
18. Ivanovo region	0.413	initial	0.393	0.500	0.346

Source: [14]

Rating No. 2. We analysed the results of regional ESG ranking of the Russian Federation by the RAEX rating consortium [17].

This rating is based on the principle of combining the level of risk exposure and assessing the effectiveness of its leveling. According to it, each negative indicator should have the positive one to level the existing risks. For instance, in the Environmental section for the indicator «Emission of pollutants into the atmosphere from stationary sources» we use the indicator «Share of captured and neutralized pollutants in the total amount of pollutants from stationary sources», etc. The higher the first indicator (negative), the higher the second one (leveling the risks) should be. The imbalance indicates risks are not being adequately addressed. It applies in the methodology of assessment E-risks and S-risks. The exception is group G (Governance) – the quality management. In this particular group assessment is based on the availability of tools to improve the quality of public administration and transparency in the regions: anti-corruption commissions, disclosure of information about the income of administration employees, etc. [18].

In March 2024 RAEX presents a draft of a new Methodology for assigning ESG ratings to companies and financial institutions [19].

The top 10 of this ranking includes regions (places in descending order): Leningrad region (1), St. Petersburg (2), Moscow city (3), Republic of Tatarstan (4), Khanty-Mansi Autonomous Okrug-Yugra (5), Lipetsk region (6), Kursk region (7), Tyumen (8 – without autonomous districts), Sverdlovsk region (9), Moscow region (10).

Among the regions of the Central Federal District (CFD), the top 10 included Moscow city, Lipetsk, Kursk, and Moscow regions. The Voronezh, Kaluga, Ryazan, Tver, and Tula regions are in the top 20. The middle ranked regions are the Vladimir, Oryol, Smolensk, and Yaroslavl regions. Regions with low ranking are Bryansk, Ivanovo, and Kostroma regions. The lowest ranking is in the Tambov region.

According to the E-component, the Lipetsk, Orel, Smolensk, Tver regions are in the top 10; the Voronezh, Kaluga, Kostroma, and Kursk regions are in the top 20. The Vladimir, Tambov and Tula regions have a low ranking. The Ivanovo region has the lowest rank.

According to the S-component, Moscow city, Belgorod and Moscow regions are in the top 10; Lipetsk, Ryazan, Tambov, and Tula regions are in the top 20. The Smolensk region ranks the lowest one among the regions of the Central Federal District.

According to the G-component, Moscow, Kaluga and Tula regions are in the top 10; Vladimir, Ivanovo, Kursk, and Ryazan regions are in the top 20 (Table 2).

Table 2 – Regional ESG-ranking of the Russian Federation by the RAEX rating consortium

Regions	Ranking of regions	Including components		
		The E-component	The S-component	The G-component
Moscow city	3	37	5	5

Regions	Ranking of regions	Including components		
		The E-component	The S-component	The G-component
Belgorod region	21	47	10	39
Bryansk region	57	35	40	66
Vladimir region	36	63	55	12
Voronezh region	16	18	23	32
Ivanovo region	54	74	51	17
Kaluga region	11	17	31	8
Kostroma region	58	12	63	74
Kursk region	7	11	21	13
Lipetsk region	6	7	14	24
Moscow region	10	36	6	34
Oryol region	32	8	52	58
Ryazan region	17	38	20	16
Smolensk region	43	3	72	70
Tambov region	71	64	19	73
Tver region	13	2	42	50
Tula region	19	68	15	9
Yaroslavl region	38	59	33	36

Source: [17]

Rating No. 3. The ranking of the Central Federal District regions according to the indicators of achieving the UN SDGs (Sustainable Development Goals) of the Center for Sustainable Development and ESG Transformation at the Moscow State Institute of International Relations – MGIMO. Compared with other ratings/rankings of Russian regions, the MGIMO 2023 ranking uses a larger number of indicators. It is explained by the necessity to ensure the most complete monitoring for all SDGs. The methodology of this rating is based on the UN methodology. It includes 169 indicators grouped for each of the Sustainable Development Goals. The first regional ranking of the Russian Federation to achieve the SDGs was presented in October 2022 at the MGIMO RAMI Congress (according to data for 2021). Before preparing the final rating, a pilot project was implemented in 6 regions. The MGIMO 2023 ranking uses 128 available in the national statistics of the Russian Federation indicators to assess the levels of SDGs achievement by regions. The implementation of national projects in regions of the Russian Federation to achieve certain targets contributed to the expansion of the indicators list. As a result, the number of rating indicators increased by 69 compared to the previous year.

The methodology of this ranking provides for the allocation of 4 clusters: economic, environmental, social, and institutional one.

The MGIMO 2023 ranking distributed the first places among 85 regions of the Russian Federation as follows (places in descending order): 1. Moscow city, 2. Belgorod region. 3. Kaluga region. 4. St. Petersburg. 5. Yaroslavl region. 6. The Republic of Tatarstan. 7. Lipetsk region, 8. The Republic of Udmurtia. 9. Tula region. 10. Moscow region. 14. Vladimir region, 16. Ivanovo region.

The Vladimir and Ivanovo regions have a high ranking for the institutional cluster and a lower for the environmental one; the Yaroslavl region has a high ranking for the economic cluster and a lower for the institutional one. Of these three regions, the Yaroslavl region has the best positions in the economic, environmental, and social cluster (Table 3).

Table 3 – Ranking of the regions of the Central Federal District according to the methodology of the MGIMO Center for Sustainable Development and ESG Transformation in 2023

Regions	Ranking of regions to achieve the UN SDGs Regions of the Russian Federation	Ranking of regions within clusters			
		Economic	Environmental	Social	Institutional
Moscow city	1	2	15	4	18
Belgorod region	2	6	5	17	23
Bryansk region	63	21	64	58	77
Vladimir region	14	24	49	32	3
Voronezh region	23	5	23	67	62
Ivanovo region	16	33	42	25	6
Kaluga region	3	7	25	10	7
Kostroma region	43	38	74	45	20
Kursk region	12	39	2	14	38
Lipetsk region	7	10	6	16	27
Moscow region	10	1	40	43	10
Oryol region	29	44	3	63	45
Ryazan region	25	31	35	41	25
Smolensk region	78	43	79	61	83
Tambov region	33	54	8	36	43
Tver region	50	46	41	71	34
Tula region	9	20	31	18	4
Yaroslavl region	5	8	10	19	22

Source: [16]

The ranking of Russian regions according to the UN SDGs within clusters according to the MGIMO methodology in 2023 showed the following:

– in the final ranking, the following regions of the Central Federal District are in the top 10 (in parentheses – the occupied place): Moscow city (1); Belgorod (2), Kaluga (3), Yaroslavl (5), Lipetsk (7), Tula (9), Moscow (10), Smolensk (78) and Voronezh regions (67) ranked the lowest;

– The Moscow region ranks the 1st in the economic cluster; Moscow city ranks the 2nd. The top 10 regions in Russia are Voronezh (5), Belgorod (6), Kaluga (7), Yaroslavl (8), and Lipetsk one (10). For instance, the 8th place of the Yaroslavl region among 85 regions of Russia is associated with the best indicators of the implementation of SDGs 9, 11, 12 compared to the Vladimir and Ivanovo regions;

– The best positions in the ecological cluster have the Kursk (2), Oryol (3), Belgorod (5), Lipetsk (6), Tambov regions (8). For instance, the low ranking of the Vladimir and Ivanovo regions is associated with lower indicators of the implementation of SDGs 2, 15 compared to the Yaroslavl region;

– according to the social cluster, the best positions have Moscow city (4), Kaluga (10), Kursk (14), Lipetsk (16), Tula (18), Yaroslavl regions (19). For instance, the higher ranking of the Yaroslavl region compared to the Vladimir and Ivanovo regions is associated with better indicators for the implementation of SDG 4. The Tver (71), Voronezh (67), Oryol (63), and Smolensk (61) regions ranked the lowest ones;

– the best positions in the institutional cluster have Vladimir (3), Tula (4), Ivanovo (6), Kaluga (7), Moscow regions (10). For instance, the 3rd place of the Vladimir region and the 6th place of the Ivanovo

region are associated with the best indicators of the implementation of SDGs 10, 16 compared to the Yaroslavl region. The Smolensk (83) and Bryansk regions (77) ranked the lowest ones (Table 4).

Table 4 – Ranking of regions by Sustainable Development Goals (SDGs) within clusters according to the number of indicators in the Methodology for each Sustainable Development Goal is indicated in parentheses for each column

Regions	SDGs social cluster			SDGs institutional cluster				SDGs ecological cluster				SDGs economic cluster			
	SDG 3 – Good Health and Well-Being (36)*	SDG 4 – Quality Education (10)	SDG 5 – Gender Equality (3)	SDG 1 – No Poverty (2)	SDG 10 – Reduced Inequalities (2)	SDG 16 – Peace, Justice and Strong Institutions (4)	SDG 17 – Partnership for the Goals (3)	SDG 2 – Zero Hunger (6)	SDG 6 – Clean Water and Sanitation (5)	SDG 13 – Climate Action (5)	SDG 15 – Life on Land (5)	SDG 8 – Decent Work and Economic Growth (14)	SDG 9 – Industry, Innovation and Infrastructure (16)	SDG 11 – Sustainable Cities and Communities (11)	SDG 12 – Responsible Consumption and Production (6)
Moscow city	10	48	2	7	82	27	3	47	4	7	79	4	7	1	23
Belgorod region	13	28	30	13	61	19	35	2	17	4	68	3	18	15	7
Bryansk region	26	66	53	59	55	57	60	57	35	30	83	17	43	61	2
Vladimir region	81	33	19	27	14	17	51	78	13	27	43	13	15	26	62
Voronezh region	42	58	68	36	72	42	33	1	25	80	48	7	3	5	29
Ivanovo region	50	38	20	50	18	6	45	70	33	18	41	20	37	62	16
Kaluga region	37	43	4	19	15	38	57	35	34	23	49	15	5	16	9
Kostroma region	44	10	73	45	6	33	81	75	73	20	54	32	60	40	15
Kursk region	20	14	29	46	51	56	17	22	2	3	66	25	22	56	60
Lipetsk region	27	37	13	24	60	36	20	7	20	5	63	48	46	7	1
Moscow region	4	80	45	10	65	18	16	14	42	32	82	19	2	11	6
Oryol region	58	42	64	47	52	20	64	25	27	10	5	27	36	72	36
Ryazan region	51	32	48	52	40	41	22	46	9	61	52	22	30	17	59
Smolensk region	65	41	59	58	58	77	61	74	48	45	85	45	41	41	44
Tambov region	30	60	32	54	44	29	52	16	18	41	14	57	34	59	66
Tver region	80	72	40	31	16	58	78	45	63	6	55	54	25	27	71
Tula region	40	53	9	25	33	46	4	43	36	9	71	51	11	21	34
Yaroslavl region	59	1	33	18	41	44	48	12	31	28	40	21	13	12	12

* *the number of indicators in the Methodology for each Sustainable Development Goal is indicated in parentheses for each column*
Source: composed by the author according to [16]

Based on the MGIMO 2023 ranking, it is possible to identify sustainable development goals with the weak positions of the regions; according to the SDGs, improving indicators will help the region take a higher

rating position.

The analysis of the MGIMO regional ranking in the context of SDGs and clusters in relation to the Vladimir, Ivanovo and Yaroslavl regions showed the following:

– by E-component (ecological cluster) Vladimir region ranked 49th place, Ivanovo region – 42nd place, Yaroslavl region – 10th place. To increase the ranking, it is necessary to improve the value of indicators for SDG-2 «Zero Hunger» (Vladimir region – 78th place, Ivanovo region – 70th place) – 6 indicators: per capita consumption of potatoes, vegetables, and food melons, meat and meat products (including by-products of category II and raw fat), milk and dairy products, vegetable oil, bread products and indicators for SDG 15 «Life on Land « (Vladimir region – 43rd place, Ivanovo region – 41st place, Yaroslavl region – 40th place) – 5 indicators: the share of land and freshwater areas under protection relevant in terms of biological diversity by ecosystem types; progress in the transition to sustainable forestry; the area of degraded lands as a percentage of the total land area; the ratio of reforestation and afforestation areas to the area of dead forest; the index of the physical volume of environmental expenditures for the conservation of biodiversity and protection of natural territories as a percentage of the previous year.

– By S-component (social cluster) The Vladimir region ranked 32nd place, the Ivanovo region – 25th place, the Yaroslavl region – 19th place. To increase the ranking, it is necessary to improve the value of the indicators of SDG 3 «Good Health and Well-Being» (Vladimir region – 81st place, Ivanovo region – 50th place, Yaroslavl region – 59th place) – 36 indicators of fertility, morbidity, mortality; related to road accidents, life expectancy, healthy lifestyle, sanitary condition water, air, soil, accessibility of medical care to the population.

– To increase the ranking of regions in the institutional cluster, it is necessary to improve the indicators of SDG 1 «No Poverty» (Vladimir region – 27th place, Ivanovo region – 50th place) – 2 indicators: the number of people with monetary incomes below the subsistence minimum, as a percentage of the total population; the average size of assigned pensions.

For the Yaroslavl region, it is necessary to improve the indicators of SDG 10 «Reduced Inequalities» (Yaroslavl region – 41st place) – 2 indicators: the fund ratio (the ratio of monetary incomes of 10% of the most and 10% of the least well-off population); the Gini coefficient (income concentration index), and SDG 16 «Peace, Justice and Strong Institutions» (Yaroslavl region – 44th place) – 4 indicators: crimes registered, total (cases per 100 thousand population); crimes registered by type (cases per 100 thousand population): bribery; receiving bribes; murders, and attempted murders.

For all three regions, it is necessary to improve the indicators of SDG 17 «Partnership for the Goals» (Vladimir region – 51st place, Ivanovo region – 45th place, Yaroslavl region – 48th place) – 3 indicators: gross regional product per capita; index of physical volume of gross regional product per capita; share of households, having broadband access to the Internet information and telecommunication network.

– To increase the ranking of regions in the economic cluster of the Vladimir region, it is necessary to improve the indicators of SDG 12 «Responsible Consumption and Production» (Vladimir region – 62nd place) – 6 indicators: the share of organizations applied innovations improving the environmental safety in the production of goods and services: 1) reduction of material costs for the production of goods and services); 2) reduction of energy consumption for the production of goods and services); 3) reduction of carbon dioxide (CO_2) emissions into the atmosphere; 4) replacement of raw materials with safe or less dangerous ones; implementation of industrial wastes, water or materials recycling; the share of disposed and neutralized production and consumption waste in the total volume of generated production and consumption waste.

For the Ivanovo region, it is necessary to improve the indicators of SDG 11 «Sustainable Cities and Communities» (Ivanovo region – 62nd place) – 11 indicators: the proportion of the number of families receiving housing and improved living conditions, among the families registered as those in need of housing; the proportion of the total area equipped with water supply; the number of public buses per 100,000 people; the share of cities with a favorable environment from the total number of cities (the urban environment quality index is above 50%); the number of citizens resettled from uninhabitable housing stock; the share of operational buses equipped to transport low-mobility groups of the population in the total number of operational buses; funds have been allocated for the preservation of cultural heritage sites; funds have actually

been disbursed for the preservation of cultural heritage sites; the share of captured and neutralized pollutants in the total amount of pollutants leaving stationary sources; the share of the length of illuminated parts of city streets, driveways, embankments in the total length of city streets, driveways, embankments; the share of the area of green spaces within the city limits in the total area of urban land within the city limits (Table 4).

Recommendations on the SDGs (if the region's place in the ranking of 85 subjects of the Russian Federation is at the bottom of the list, i.e. 43rd place and below) for all regions of the Central Federal District are presented in Table 6.

The highest positions on the implementation of the SDG of the social cluster are in the Belgorod, Kursk, and Lipetsk regions; on the implementation of the SDGs of the ecological cluster are the Orel and Yaroslavl regions; the economic cluster includes Moscow city, Belgorod, Voronezh, Kaluga, Moscow, and Yaroslavl regions. There are no advanced regions on institutional cluster in terms of the SDGs implementation. However, the implementation of 2 SDGs is balanced in two regions; in the Belgorod region according to the SDGs of the social and economic clusters, and in the Yaroslavl region according to the SDGs of the economic and environmental clusters (Table 5).

Table 5 – Recommendations for improving the rating position of regions within the framework of the Sustainable Development Goals (MGIMO-2023 methodology)

Regions	SDGs social cluster	SDGs institutional cluster	SDGs ecological cluster	SDGs economic cluster
Moscow city	SDG-4 (48)*	SDG-10 (82)	SDG-2 (47), SDG-15 (79)	-
Belgorod region	-	SDG-10 (61)	SDG-15 (68)	-
Bryansk region	SDG-4 (66), SDG-5 (53)	SDG-1 (59), SDG-10 (55), SDG-16 (57), SDG-17 (60)	SDG-2 (57), SDG-15 (83)	SDG-9 (43), SDG-11 (61)
Vladimir region	SDG-3 (81)	SDG-17 (51)	SDG-2 (78), SDG-15 (43)	SDG-12 (62)
Voronezh region	SDG-4 (58), SDG-5 (68)	SDG-10 (72)	SDG-13 (80), SDG-15 (48)	-
Ivanovo region	SDG-3 (50)	SDG-1 (50), SDG-17 (45)	SDG-2 (70),	SDG-11 (62)
Kaluga region	SDG-4 (43),	SDG-17 (57)	SDG-15 (49)	-
Kostroma region	SDG-3 (44), SDG-5 (73)	SDG-1 (45), SDG-17 (81)	SDG-2 (75), SDG-6 (73), SDG-15 (54)	SDG-9 (60)
Kursk region	-	SDG-1 (46), SDG-16 (56)	SDG-15 (66)	SDG-11 (56), SDG-12 (60)
Lipetsk region	-	SDG-10 (60)	SDG-15 (63)	SDG-8 (48), SDG-9 (46)
Moscow region	SDG-4 (80), SDG-5 (45)	SDG-10 (65)	SDG-15 (82)	-
Oryol region	SDG-3 (58), SDG-5 (64)	SDG-10 (52), SDG-17 (64)	-	SDG-11 (72)
Ryazan region	SDG-3 (51), SDG-5 (48)	SDG-1 (52)	SDG-2 (46), SDG-13 (61), SDG-15 (52)	SDG-12 (59)
Smolensk region	SDG-3 (65), SDG-5 (59)	SDG-1 (58), SDG-10 (58), SDG-16 (77), SDG-17 (61)	SDG-2 (74), SDG-6 (48), SDG-13 (45), SDG-15 (85)	SDG-8 (45), SDG-12 (44)

Regions	SDGs social cluster	SDGs institutional cluster	SDGs ecological cluster	SDGs economic cluster
Tambov region	SDG-4 (60)	SDG-1 (54), SDG-10 (44), SDG-17 (52)	-	SDG-8 (57), SDG-11 (59), SDG-12 (66)
Tver region	SDG-3 (80), SDG-4 (72)	SDG-16 (58), SDG-17 (78)	SDG-2 (45), SDG-6 (63), SDG-15 (55)	SDG-8 (54), SDG-12 (71)
Tula region	SDG-4 (53)	SDG-16 (46)	SDG-2 (43), SDG-15 (71)	SDG-8 (51)
Yaroslavl region	SDG-3 (59)	SDG-16 (44), SDG-17 (48)	-	-

* The place of the region in the Methodology for each Sustainable Development Goal is indicated in parentheses.
Source: composed by the author according to [16]

Our analysis showed the highest ranks (Top 5) of Moscow city, Kaluga, Lipetsk, Moscow, and Kursk regions. The lowest ranks have the Smolensk, Bryansk, Kostroma, Tambov, and Ivanovo regions. The regions ranks were distributed as follows (Table 6):

1. Moscow city – according to the results of three ratings, 5 points were scored;
2. Kaluga region (18 points);
3. Lipetsk region (21 points);
4. Moscow region (23 points);
5. Kursk region (24 points);
6. Belgorod region (25 points);
7. Tula region (35 points);
8. Voronezh region (45 points);
9-10. Ryazan and Yaroslavl regions (55 points each);
11. Vladimir region (65 points);
12. Oryol region (71 points);
13. Tver region (80 points);
14. Ivanovo region (88 points);
15. Tambov region (113 points);
16. Kostroma region (115 points);
17. Bryansk region (131 points);
18. Smolensk region (137 points).

Table 6 – Final ESG rankings of the Central Federal District regions for three ESG rankings

Regions	Ranking of regions			Final scores (the sum of the places in columns 2,3,4)
	National Rating Agency (NRA)	RAEX Rating Consortium	MGIMO Center for Sustainable Development and ESG Transformation	
Moscow city	1	3	1	5
Belgorod region	2	21	2	25
Bryansk region	11	57	63	131
Vladimir region	15	36	14	65
Voronezh region	6	16	23	45
Ivanovo region	18	54	16	88

Regions	Ranking of regions			Final scores (the sum of the places in columns 2,3,4)
	National Rating Agency (NRA)	RAEX Rating Consortium	MGIMO Center for Sustainable Development and ESG Transformation	
Kaluga region	4	11	3	18
Kostroma region	14	58	43	115
Kursk region	5	7	12	24
Lipetsk region	8	6	7	21
Moscow region	3	10	10	23
Oryol region	10	32	29	71
Ryazan region	13	17	25	55
Smolensk region	16	43	78	137
Tambov region	9	71	33	113
Tver region	17	13	50	80
Tula region	7	19	9	35
Yaroslavl region	12	38	5	55

Source: composed by the author according to [14; 16; 17]

Conclusions

The development and implementation of regional ratings/rankings by Russian rating agencies, universities or sustainable ESG development companies contribute to the improvement of Russian national statistics on sustainable development. Rating agencies use different methods in compiling ESG ratings. Consequently, the same regions can rank different positions with the same initial data. Therefore, there is a need of unified methodological approach. It allows ones to assess the parameters of regional sustainable development and ESG transformation, measure the level of sustainability and determine the trends of their sustainable development.

The highest positions on the implementation of the ESGs of the social cluster are in the Belgorod, Kursk, and Lipetsk regions; on the implementation of the ESGs of the ecological cluster are the Orel and Yaroslavl regions; the economic cluster includes Moscow city, Belgorod, Voronezh, Kaluga, Moscow, and Yaroslavl regions. There are no advanced regions on institutional cluster in terms of the ESGs implementation. Two regions have the balanced implementation of two SDGs: the Belgorod region for the SDGs of the social and economic clusters, and the Yaroslavl region for the SDGs of the economic and environmental clusters. The Bryansk region should to improve all SDGs indicators of the institutional cluster; the Smolensk region should to improve all SDGs indicators, both institutional and environmental cluster.

Analysis of three ESG ratings of the Vladimir, Ivanovo, and Yaroslavl regions showed the highest rank of the Yaroslavl region. The Vladimir and Ivanovo regions ranked 2nd and 3rd, respectively. In the absence of a unified methodology for conducting the ratings, the comparative position results of these three regions differ in various ratings. It requires developing of a unified national methodology.

According to the E-component, the Yaroslavl region ranks the highest among all 3 rankings; the Vladimir region ranks higher compared to the Ivanovo region in 2 ratings (NRA and RAEX); the Ivanovo region ranks higher in the MGIMO rating on ecology for 2 of these regions. According to the S-component, the Yaroslavl region (RAEX and MGIMO) is a leader of 2 rankings; the Ivanovo region ranks the 2nd; the Vladimir region – the 3rd. According to the NRA ranking, the Vladimir region ranks the 1st; the Ivanovo region ranks the 2nd; the Yaroslavl region – the 3rd. According to the G-component, the Vladimir region is a leader of 2 rankings; the Ivanovo region ranks the 2nd; the Yaroslavl region (RAEX and MGIMO) – the 3rd.

The Ivanovo region ranks the highest in the NRA ranking, followed by the Vladimir and Yaroslavl regions.

The analysis of regional ranking by the MGIMO methodology in the context of the Sustainable Development Goals showed that according to the E-component (ecological cluster) the Vladimir and Ivanovo regions should improve their indicators for SDG 2 «Zero Hunger»; all three regions should improve their indicators for SDG 15 «Life on Land».

To improve the ranking of regions in the economic cluster of the Vladimir region, it is necessary to improve the indicators of SDG 12 «Responsible Consumption and Production».

The Ivanovo region should improve the indicators of SDG 11 «Sustainable Cities and Communities».

According to the S-component (social cluster), all three regions should improve indicators of SDG 3 «Good Health and Well-Being».

To increase regional ranking in the institutional cluster, it is necessary to improve the indicators of SDG 1 «No Poverty» for the Vladimir and the Ivanovo regions.

The Yaroslavl region requires to improve the indicators of SDG 10 «Reduced Inequalities» and SDG 16 «Peace, Justice and Strong Institutions».

Hence, it is necessary to increase the indicators of SDG 17 «Partnership for the Goals».

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The role of economic and structural factors in the development of agriculture: regional approach

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ORIGINAL ARTICLE

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Abstract. The article analyses the impact of various economic and structural factors on the development of agriculture in Russian regions based on statistical data and a variety of economic and mathematical methods. The research uses calculation of relative and average values, multivariate grouping, and regression analysis. The cluster analysis revealed two groups of regions in terms of gross value added. The first group includes regions with highly developed agriculture significantly exceeding the indicators of the second one. This is confirmed by the results of regression analysis. Investments in fixed assets turned out to be the most significant factor affecting gross value added. Additionally, research forecasts a variable with fluctuations in independent characteristics by simulation modelling. It demonstrates the resilience or vulnerability of the agricultural sector to changes in the economic environment. The research results have practical significance for development of state support measures and increase the efficiency of the agrarian sector in Russian regions, providing food security and sustainable economic development.

Introduction

Agriculture plays a key role in the Russian economy. It ensures the country's food security and makes a significant contribution to the gross domestic product. However, this sector has repeatedly faced serious challenges during periods of large-scale economic reforms. In the 1990s, the country radically transformed its economic system. It resulted in the emergence of private ownership of the means of production. It also caused the disruption of inter-industry relations, inflation, reduction of governmental support, and price disparity. Hence, the economy was significantly weakened. Recently, Russian agriculture has been gradually recovering. However, many challenges exist as a result of previous crises and reforms.

Therefore, the research is extremely relevant and concerns with the impact of economic factors affecting agricultural development.

Indeed, we decided to consider the impact of various economic indicators on the dynamics of agricultural production using statistical data and applying multidimensional analysis and regression modelling.

The research results contribute to understanding of the economic factors determining the sustainability and development of agriculture in Russia. It allows ones to develop more effective governmental support measures to strengthen the agricultural sector, provide sustainable conditions for its development, and improve the country's food security.

Methods

The study assessed the relationship of key indicators characterising agriculture in the regions of Russia. The following indicators of gross added value (GVA) were selected as initial data. They are taken

from open sources, primarily from data from the Federal State Statistics Service[1] (Rosstat) and the Unified Interdepartmental Information and Statistical System[2] (UIISS):

Y – GVA by the agricultural activity, forestry, hunting, fishing and fish farming, thousand RUB;

X1 – agricultural products (mln, RUB);

X2 – the average annual number of people employed in the economy since 2016 (people, values of the indicator for the year, calculated on the basis of data integration);

X3 – the cost of fixed assets for «Agriculture, forestry, hunting, fishing, and fish farming» (mln, RUB);

X4 – investments in fixed assets in «Agriculture, forestry, hunting, fishing, and fish farming» (mln, RUB);

X5 – gross yield of grain (thousand tons);

X6 – production of livestock and poultry for slaughter (thousand tons);

X7 – milk production (thousand tons);

X8 – crop acreage (thousand hectares);

X9 – feed consumption per conventional head of cattle in agricultural organizations (hundredweight of feed units);

The indicators do not include Khanty-Mansiysk Autonomous Okrug – Yugra, Yamalo-Nenets Autonomous Okrug (their data are insignificant and are included in the indicators of the Tyumen region; similar for Nenets Autonomous Okrug – the data are included in the indicators of the Arkhangelsk region). We do not consider Moscow, St. Petersburg, and Sevastopol due to their low rates.

Main part

Indeed, we consider the variation of agricultural gross value added (GVA) of the Russian Federation regions. Therefore, we construct a box-and-whiskers diagram. It allows us to visualise the distribution of GVA by federal districts, 2016, 2019, 2022 (Figure 1).

To construct the diagram, the tools of the Python Plotly library were used. It allows us to create interactive visualisations.
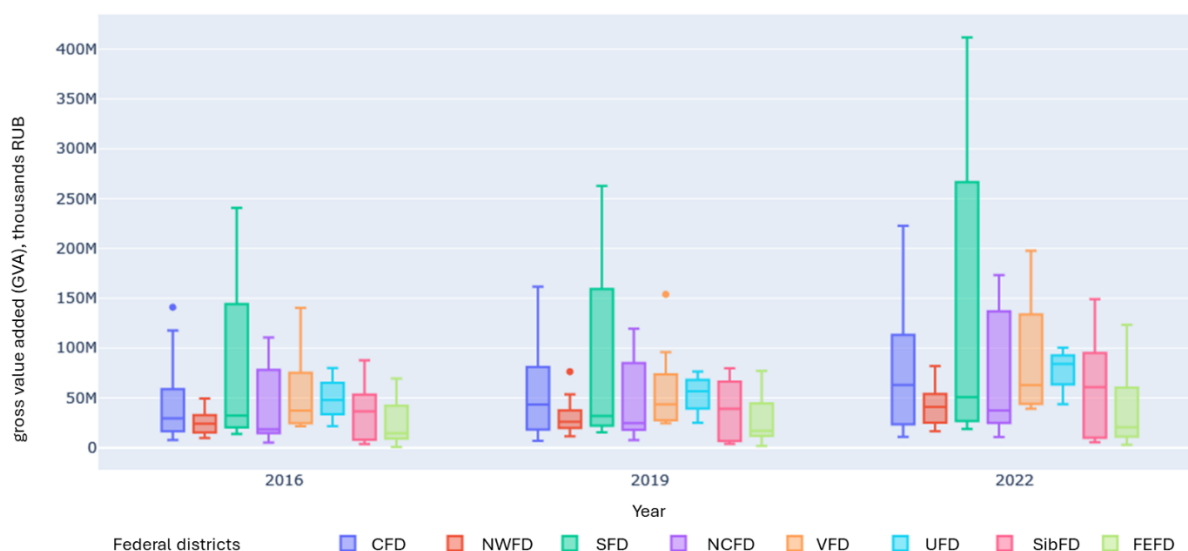

Figure 1. Variation of the GVA by type of activity «Agriculture, forestry, hunting, fishing and fish farming», 2016, 2019, 2022, mln RUB

Source: composed by the authors

The data in Figure 1 cover a period of three years and show significant differences in median values among federal districts. The highest variation is observed in the Central, Southern, North Caucasian, and

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[1] *Russian Statistical Yearbook: Federal State Statistics Service. URL: https://rosstat.gov.ru/folder/210/document/12993 (Assessed 10.09.2024).*

[2] *A unified interdepartmental information and statistical system. URL: https://fedstat.ru / (Assessed 10.09.2024).*

Volga districts. It is primarily due to natural and climatic features [1]. Russia has only a limited number of regions appropriate for crop cultivation. They are Central Black Earth region, southern regions such as Kuban and Stavropol, and southern parts of Siberia, especially Altai Krai. However, livestock farming may be developed in most parts of the country, but its costs and profitability vary considerably by region.

In addition, the data for the three studied years demonstrate a gradual increase in agricultural GVA in all districts and especially in the Southern Federal District (SFD). It indicates a positive trend in the agricultural sector, despite differences in environmental conditions and costs.

Consequently, it would be incorrect to assess the level of development and efficiency of agriculture equally across the country without considering regional specifics.

The next research stage is clustering the Russian Federation regions by a set of independent variables for 2022. For this purpose, we apply cluster analysis as a methods of multidimensional statistical analysis. It allows us to identify structures in data and cluster them by similarity [2]. We apply the union method as the clustering algorithm; the distance measure is the Euclidean distance. To form clusters, we use the Ward method. It optimises the total intra-group distance and effectively organises regions into groups. The implementation of this cluster procedure was performed using the Python programming language and the Plotly library. The results of the clustering algorithm are visualised (Figure 2).
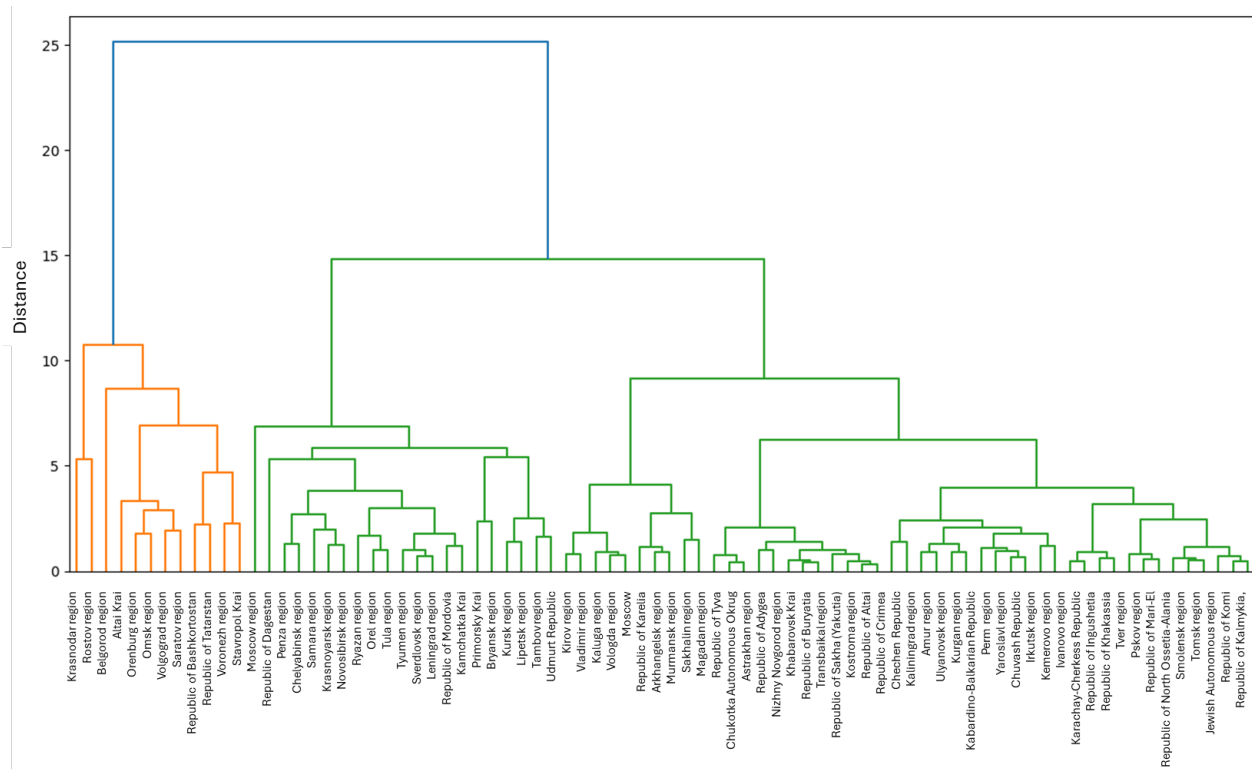

Figure 2. Tree diagram of groups of the Russian Federation regions in terms of the agricultural development

Source: composed by the authors

The Russian Federation regions are located on the OX axis, and on the OY axis is the value of an integral indicator formed on the basis of factors affecting the development of regional agriculture. This indicator does not have the units of measurement; it is a multidimensional statistical estimation.

The first cluster is located between Krasnodar and Stavropol Krai. It includes 12 regions of the Russian Federation. The average value of gross value added (GVA) for this group is 198,825,839 thousand RUB; the coefficient of variation is 40.98%. It indicates high indicators of economic activity and development of the agricultural sector in these regions.

The second cluster is located between the Moscow region and the Republic of Kalmykia. It includes 68

regions of the Russian Federation. The average value of gross value added (GVA) for this group is 52,572,615 thousand RUB; the coefficient of variation is 71.49%. Therefore, this group includes subjects with low values of the effective variable. It indicates limited opportunities for farming.

Indeed, the initial set of subjects was divided into two groups. It confirms the hypothesis of the existing regional differentiation in terms of resource provision and the possibilities of agricultural activity [3]. According to the identified patterns, we construct a regressive model with a fictitious variable D. It will assume the value 1 if the subject belongs to the first cluster and 0 if it belongs to the second one. It allows us to assess the stratification in the aggregate of regions.

The Python programming language and the Plotly library were used to build the regression model. The simulation result for the first (Figure 3) and second clusters (Figure 4).
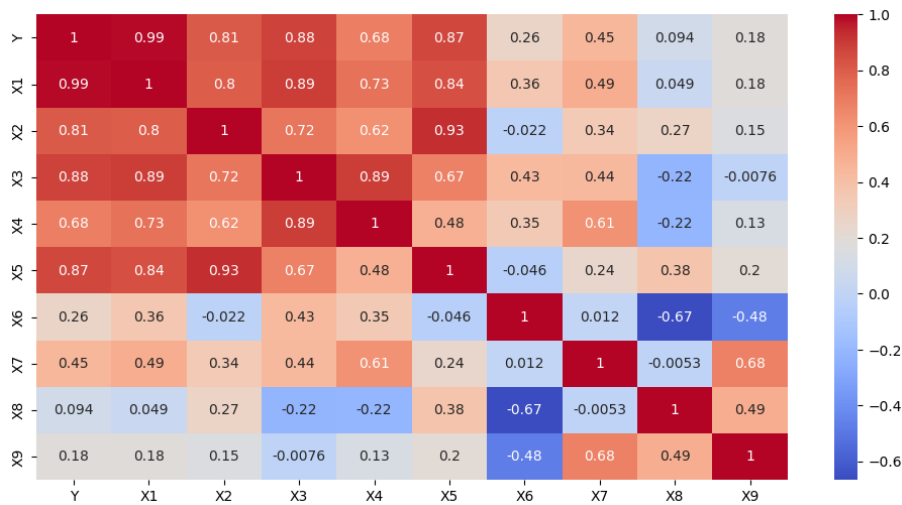

Figure 3. The value of the correlation coefficients for the first cluster
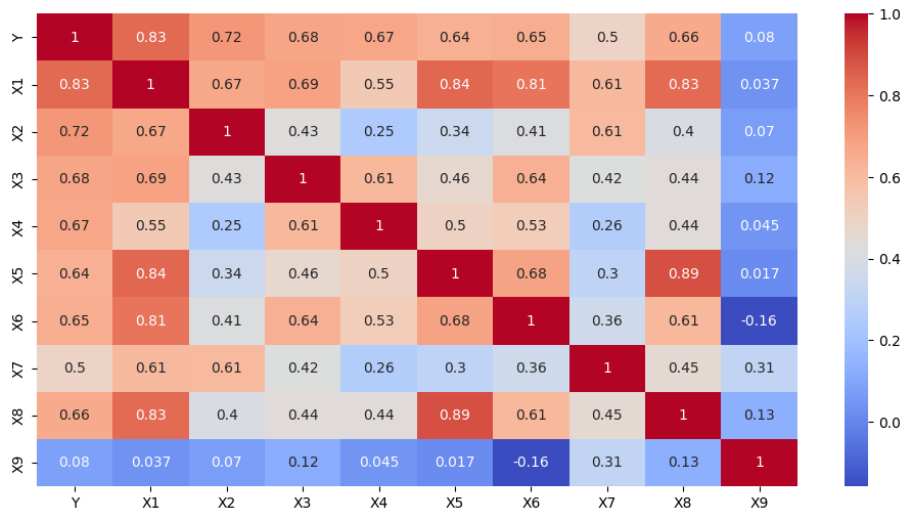*Source: composed by the authors*

Figure 4. The value of the correlation coefficients for the second cluster
Source: composed by the authors

According to the data on the correlation coefficients for both clusters, not all selected factors have a significant impact on the gross value added (GVA) in agriculture. Moreover, the significant factors vary in different subgroups of the Russian Federation regions. It additionally confirms the hypothesis on a significant differentiation between regions in terms of their resource provision [3].

Furthermore, there is a significant relationship between the independent variables. It indicates the presence of a multicollinearity problem. Multicollinearity complicates the separation of the specific variable's contribution to the final outcome. It may provide the distorted estimates of the regression model coefficients. In

such conditions, application of all factors in one model may result in incorrect conclusions on the significance of individual variables and their influence on the outcome variable.

Therefore, it is necessary to adjust the structure of the regression model. Hence, we use only the most significant factors in the model and include the variable D. The X4 indicator was chosen as one of the key factors. It shows the impact of investments on agricultural GVA. The results of estimating the values of the economic model are presented in Table 1.

Table 1 – The results of estimating the values of the economic model of D and X4 impact on agricultural GVA in the Russian Federation regions (calculated using the Python programming language and the Plotly library)

Model Elements	Regression coefficients b_j	The standard error of b_j	The actual values of t(71) - Student statistics	p-significance level
Intercept term	127,202,088.92	13,654,520.48	9.32	0.0
D	-102,486,714.89	12,398,849.71	-8.27	0.0
X4	4,033.01	508.98	7.92	0.0

Source: composed by the authors

The regression equation is characterized by a high value of determination coefficient $R^2 = 0.75$. It explains 75% of dependent variable variation of the independent variables.

The statistical significance of the equation is confirmed by the high value of Fisher's F-statistics F (3.4) = 118.19 with a significance level of $p \approx 3.4 \times 10$-24. It indicates the general significance of the entire regression model. The actual value of the Student's t-statistics indicates the statistical significance of the equation parameters.

The interpretation of the parameter at X4 is as follows: an increase in investments in fixed assets by 1 min RUB increases agricultural GVA by 508.98 thousand RUB.

The value of the dummy variable D shows a gap between the groups of the Russian Federation regions. The local regression line for the second cluster runs lower by 10,286714.89 RUB. It highlights the differences in the level of agricultural development between these regional groups. The simulation is visualised in Figure 5.
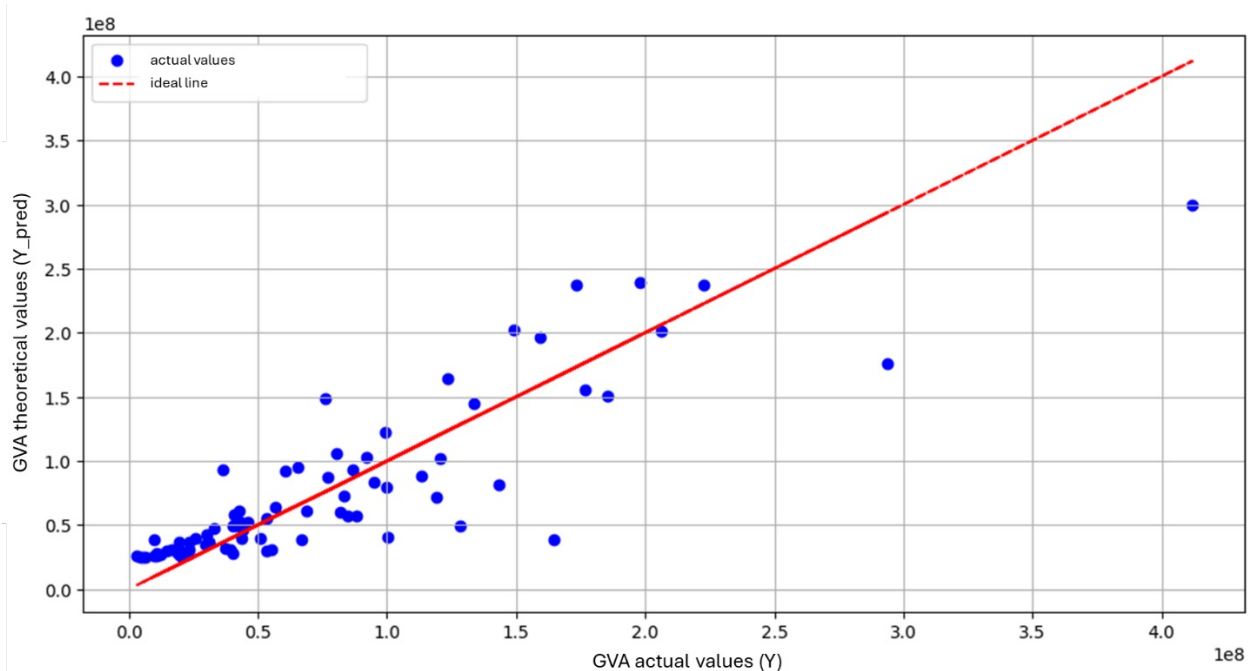

Figure 5. Scattering diagram of GVA actual and theoretical values

Source: composed by the authors

The differentiation of the Russian regions in terms of the agricultural development is clearly visible. It is confirmed by various points of intersection of local regression lines with the OY axis. Hence, it confirms the hypothesis put forward earlier.

After confirming the statistical significance of the constructed model, simulation modeling was performed. It provides two scenarios: an optimistic one – the values of the independent variable X4 were increased by 25%, and a pessimistic one – the same value was underestimated by 25%, reflecting possible positive and unfavorable economic conditions (Table 2).

Table 2 – Simulation results of the dependent variable with underestimated and overestimated values of the X4 variable (calculated using the Python programming language and the Plotly library)

Variables	Optimistic forecast		Pessimistic forecast	
	1st cluster	2nd cluster	1st cluster	2nd cluster
D	1	0	1	0
X4	8,634	22,199	5,180	13,320
Point forecast Y	59,536,925	216,731,776	45,608,305	180,919,901
-0,95%CL	47,989,160	192,042,692	35,520,883	158,441,739
+0,95%CL	71,084,691	241,420,860	55,695,727	203,398,063

Source: composed by the authors

According to both scenarios, even with optimal forecasts, the regions included in cluster 1 are significantly advance the regions of cluster 2. This indicates the existence of systemic problems with ensuring food security at the regional level. In particular, regions with low agricultural development indicators experience significant challenges. They are exacerbated by logistical difficulties and the high cost of food transportation, especially in the remote regions of Siberia, the Far East and the Arctic zone. Redistribution of resources from more developed regions of the 1st cluster may help to address the problem. However, such measures are associated with increasing the cost of food products for the consumers. It is particularly acute in regions remote from major traffic routes. Therefore, an integrated approach is needed to address the problem. This approach should include improving the efficiency of agriculture in the regions of the 2nd cluster, developing transport infrastructure and programmes to support the agricultural sector.

Conclusion

Indeed, the Russian Federation regions are significantly differentiated in terms of the agricultural development. The cluster analysis revealed two groups of regions in terms of gross value added (GVA). The first group includes regions with highly developed agriculture significantly exceeding the indicators of the second one. This is confirmed by the results of regression analysis. Investments in fixed assets turned out to be the most significant factor affecting GVA.

Simultaneously, a multicollinearity problem was recognized. It requires a revision of the model and the exclusion of variables with a negligible effect. The results of simulation modelling based on optimistic and pessimistic scenarios demonstrated higher GVA values in the regions of the first cluster even under unfavorable economic conditions. It indicates a sustained superiority of agricultural economic development in some regions. Moreover, it requires the design of support measures and development strategies to improve the situation in underdeveloped regions.

Hence, the results emphasize the importance of targeted actions at the level of public policy aimed at improving the efficiency of agriculture, transport infrastructure, and ensuring favorable conditions for the agricultural sector with low development indicators.

CONFLICT OF INTEREST
The authors declare that there is no conflict of interest.

AUTHOR'S CONTRIBUTIONS

Sergey N. Kosnikov – writing – original draft; formal analysis
Alexander P. Berus – data curation; visualization;

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Reality as a category of new political economy

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ORIGINAL ARTICLE

Abstract. The purpose of the article is to present a scientific substantiation of worldview perception as a decisive economic factor ensuring the functioning of the «Man-Nature» system. The paper offers to discuss research results on the processes of economic time warp and functioning of the general economic space in the abstract equilibrium of political economy phenomena of exchange and distribution in terms of Nature and Labour. Moreover, the paper considers the perspective of worldwide noonomic future economic patterns. Nowadays, it is declared as contributing the destruction of the binary perception of economic science reality. The research methodology is based on the principles of postclassical political economy, the principle of economic relations tensor invariance quantization, the system principle of analysis, the principle of conceptual apparatus consistency. The theoretical basis consists in the concepts of noonomics and physical economics. The scientific novelty of the study identifies extraordinary positions: on the development of multilevel economic systems; on the creation of an economic theory of education in order to provide scientific solutions to practical problems of economics as a model of social development; on the basis of scientific geriatrics. The article allows ones to organise a discussion between those who would like to expand their worldview positions in the search for value judgments about what is happening in the world around them. The human worldview defines every person and the society (economic entities – individual, a collective, a community, as well as an entrepreneur, banker, manager, employee, head or family member) as a whole. According to Yu. M. Osipov, economy and management (not only material-material-consumer, but also ideal-values-existential) define the society existence. It is clearly shown and convincingly proved by the socio-economic reality, including the military one. Worldview is both an economic factor and an object of ideological, moral, cultural and spiritual management.

Keywords: political economy; methodology of economic cognition; reality; economic future

JEL codes: A13, B14, B51

Reality is always the ideas of our consciousness.
Its main characteristic is cyclic nature.
Depopulation is the displacement of the material ideas around us, including those in outer space!

Introduction

There are several reasons for global decision worldview deformation.

The essence of understanding reality deformation:

1. The reality in the evolution of the «Nature – Society» system in terms of biosphere (while preserving it) by the noosphere is considered as a capitalism prank [7].

2. Reality is actualised in the emergence of the theoretical concept of noonomics. It replaces the capitalist model of capitalist arrangement of socio-economic (development) existence. It is also implemented the emergence of world change noospheric paradigm as a tool of economic necessity of the rejection of world agreement organisation practice and collective resistance to the emergence of the sanctions.

3. Nowadays, there is a decrease in the spiritual value of work as a source of human life ahead of time [13].

4. Moreover, there are traditional capitalism attempts to transform itself into so-called «inclusive capitalism» in the contrary to V. Lepekhin's solidary economy doctrine.

5. Also the presence of economic science certainty as a trigger for creating reality from its reality as a geo-reality is considered [14].

6. Indeed, there is ignoring the role of the new political economy as a science of human economic activity in Nature, as well as the reasons for the development of scientific knowledge as the foundation of the future.

7. There is a possibility of creating special digital area in the process of radically changing the rules of life outside of Nature.

8. We can observe multinational states disintegration and the development of nation identity.

9. Nowadays, fictitious neural network financialism is considered as a sign of posteconomics (postcapitalism).

10. There is a presence of state quantum reality of socio-economic life with ideas about it.

One of the most important factors in the collapse of the USSR was the insensitivity to innovation. It causes the loss of technological sovereignty and economic crisis. Decisions in the bureaucratic system were made on the basis of shadow connections. Indeed, non-competitive economics was used mainly to justify authorities' decisions. Hence, some authorities do not care on ideology: political economy has been replaced by economics to justify government actions.

The death of the dream of justice causes a crisis in the value system and elites moral degradation. The loss of the coordinate system causes the loss of the country's development and balance between human development and the accumulation of personal capital by the elites [10].

11. The global elite hybrid war against humanity aimed at destroying the human in man.

Currently, the focus of the confrontation has shifted to the field of competitive innovative development. Moreover, in the strategic period it will determine the country's defence capability. Innovative development should be implemented in conditions of restrictions on Russia's access to modern knowledge and technologies from the collective West: the EU made such a decision on March 3, 2022, the United States – on June 11, 2022.

12. The successful introduction into the minds of people of fashion on «digital» organization of relations.

13. There is a lack of research providing the foundation for a new sociality of development, using a project-based social approach to predicting the future of humanity. The coordinates for landmarks and priorities are set by the system of national values. It is formed on the basis of traditions, created values of the present and ideals of the future. Relevant economics, which is workable in the context of the development of complex economic systems, is extremely important. Economics and development management create the future by changing the present, unlike the natural science study of the world and risk management.

The coordinates for landmarks and priorities are set by the system of national values. It is formed on the basis of traditions, created values of the present and ideals of the future. Relevant economics, which is workable in the context of the development of complex economic systems, is extremely important. Economics and development management create the future by changing the present, unlike the natural science study of the world and risk management.

14. The mass identification of the reality of being and virtual reality [1], which arose due to: a) technological capabilities to ignore most economic phenomena when identifying economics as a science, and b) inability to isolate the essence behind computer-presented events and a «non-optimistic» attitude to predicting the consequences of such behaviour.

As a result, today youth do not understand how was Yu. Gagarin launched into space and a nuclear shield was established.

15. Therefore, IT specialists as representatives of digital reality (or unreality) claim, jokingly: in reality there are no nationality, age and personal history, there is only a well-paid corporate reality… Because the more difficult the task is set by real life, the easier it is not to solve it at all.

16. There are pronounced trends towards changing the architecture worldwide; the emergence of a bipolar world. The anthropocentrism transforms into contradictions of financial and industrial capital. The

economic relations of capitalism transform into falsehood.

17. The abolition of ideology becomes the basis of a metaphysical worldview on world economy «globalization». The digital technologies replaced ideological ones.

18. Also there is an absence of economic units for measuring reality. Nowadays, we can observe the emergence of serial time of consumer value,

19. The crisis of education: its images and patterns [13], the occult justification of eternity, exhaustion of the role of science, degradation of faith in the Lord and science, and

20. Destruction of family as a whole.

There is well-known evidence of the need for a theory for effective practical actions.

Therefore, in the beginning, we will talk about an economic theory adequate to the modern world economy. Hence, there is an issue of a category of «reality» in modern economics. In the process of evolution of economics, it characterised by a loss of certainty. The methodology of economics has become just theoretical instead of logic.

Pure economics has become the problem of intuition in economic research through the provable and unprovable, the calculable and the incomputable, thinking about the metaphysics of calculus on noonomics as a continuation of the theory. Economic theory with its equilibrium is not fine yet. And the new political economy is still very vague, and theoretically incomplete. Therefore, density of economic relations is increasing, but the role of nanoeconomic relations is weakening.

The new economic sphere is determined by the motives of economic decisions (for example, sanctions). Otherwise, most importantly, by the prerequisites and reasons for the formation of geopolitical and economic reality at various levels, sectors, and segments [3]. We emphasize prevailing of traces of economic knowledge for practitioners of economic activity. Therefore, request to economic knowledge has increased markedly. There were also risks of further confrontation between educational literature intended for production specialists, managers, engineers, economic and financial departments, pricing departments and scientific labour organization, etc.). The confrontational rhetoric of theorists and practitioners is demonstrated at conferences and symposiums. It shows the unwillingness of their participants to take into account each other's opinions.

To a large extent, there is a new increase in the problem of the gap between economic science and practice [9].

Firstly, as claimed by many authors, the geopolitical and economic world order has changed.

Secondly, the scientific and technological content and nature have changed (including digitalization, virtualization, supply and demand values).

Thirdly, new forms of economic relations have been formed; new manifestations of their deformation appeared.

Fourthly, the Special Military Operation (SMO) influences on the state.

Fifth, sanctions in the world trade has practically revived the mechanisms of state strategic planning.

Sixth, demographic characteristics and confessional family values, which usually play a key role, suggested the need for institutional regulations of people's economic life.

Seventh, there is a bestiary of economic science. A tectonic shift is needed in the conceptual and categorical methodological apparatus of economics. For instance, property acts as a relation (property of security (endowment) with power. Therefore, it is no longer a purely economic category, but a politico-economic one. Hence, political economy was removed from the list of studied economic disciplines and left only as a scientific discipline (located in the bestiary of economic science).

Finally, it is necessary to ensure economic relations with the endowment of power (the «contractual domain» system of providing power in the Caucasus and Eastern Siberia opposes the processes of endowment with power).

Main part

Part 1. The New Economic Realism

Section 1.1. The Evolution of Economics: The Loss of Certainty

The categorical apparatus of modern economics does not contain such categories as «time» and «space». These concepts have existed in the economic literature for a very long time. Therefore, we consider time in order to determine the possible essence of the new economic realism.

Time is expanding and slowing down. Indeed, time has not always existed, because motion is a way of time's existence in space. Social media is becoming a time trap. For instance, D. Adams considers time as a measure of reality. Of course, this is a subjective perception of reality.

Time is a mysterious and fundamental aspect of life.

To investigate the nature of economic time and its various aspects is the task of economics. It will determine the validity of economic theory.

The concept of reality is usually closely correlated with the concept of «time», especially in its typological and specific characteristics.

Typical characteristics are the present, past (departed) time, future (coming) time; specific characteristics in the literature usually include historical, social, psychological, economic time.

However, natural sciences traditionally consider the question of the existence of time and distinguish astronomical time as physical, quantify it in units of measurement.

Indeed, we will consider reality in economics through the allocation of economic time.

We will interpret economic time as a relationship between events; as a sequence of phenomena and changes occurring in the economic space, in its understanding, definition in our previously implemented publications [11]. Moreover, the use of economic relations quantization tensor invariance principle as a way of economic behaviour of individuals (individual or aggregated subjects) allows ones to discuss the curvature of economic time and the emergence of deformational economic relations. Its main characteristic is cyclic nature.

Time is something that does not allow everything to exist simultaneously. These circumstances are the source of the saying that money is time.

Time is an object of labour for us. This is a unique feature of our civilization. Authorities in our country are constantly experimenting with time: according to the Bolsheviks, there was a feudal system, the whole world was moving towards capitalism for a very long time, and our country will rapidly achieve the socialism; according to E. Gaidar, the country should return back into the book capitalism of the XVIII century that never existed. We will learn something there, and immediately get into the XXI century. The Russians try to remake and control time. They recode themselves, because recoding is always an attempt to reconcile the future with the past.

The «Sovok» is not a Soviet and / or post-Soviet person; it is a person who does not accept the struggle for money or social status as the goal of life. There is no functional mental action. But in politics, reality is outlined as digitalization.

By 2030, it is necessary to form digital platforms in all key sectors of the economy and the social sphere. These and other complex tasks will be solved within the framework of the new national project «Data Economy». At least 700 bn RUB will be allocated for its implementation in the next six years. The new National Strategy for the Development of Artificial Intelligence sets new goals, including ensuring technological sovereignty in such revolutionary areas as generative artificial intelligence, and language models.

Section 1.2. Inconvenient realism (economic theory with its equilibrium is not complete) is a tool for understanding the world and time

According to sociological surveys, 36% of Russians believe in astrological forecasts, 26% – in eternal life, and 32% – in aliens. Indeed, the most complex times in our history are considered to be the early 1990s – 38% of Russians believed in extraordinary things. By 2012, there were one and a half times more of them – 59%. In 2013, a survey by the Institute of Sociology of the Russian Academy of Sciences showed that 67% of Russian women and 4% of men turned to magicians and fortune tellers.

In our opinion, belief in miracles is directly related to the development prospects of a particular country.

For instance, countries with the high level of «expectation of a miracle», the interest on loans is higher, too – bankers insure their risks. However, is more difficult for marketers to predict the balance of supply and demand; it forces the manufacturer to raise the prices.

For 90% of Russians, it was a shock to find out how much of their salary the employer pays to various funds. Previously, they thought that medicine and defence were paid for from «oil» revenues. Another common belief is as follows: the main condition for country prosperity is a strong leader addressing all issues. Otherwise, stagnation of economy causes income decreasing. It, in turn, causes expectations increasing. For instance, during the 2016 crisis, lottery ticket sales increased by 46% – to almost 40 mln pieces.

These public magical consciousness provides abandoning the modern form of thinking based on the understanding of cause-and-effect relationships. Although 77% of Russians surveyed called themselves Orthodox, there is no Christian elaboration of consciousness, beliefs, and ethics: 61% did not read the Bible; 40% believe in God; 4-7% regularly visits churches.

Turning to religion has become a kind of curse against misfortune, an attempt to «protect» oneself after death. Therefore, amulets, icons in cars and queues for relics are occurred. However, 10 years ago, more people believed in witchcraft than in the honesty of the Duma elections – 48 and 47%, respectively.

A few years ago, the chief cardiologist of Moscow, Y. Buziashvili, said that Russians spend up to $ 30 USD bn a year on treatment by non-traditional specialists. Moreover, 52% of Russians trust in folk medicine; more than a third of population is sceptical of traditional doctors. Hence, any death or injury of a patient will be considered as a result of the incompetence of the physician. Charlatans are flooding the cities just against the background of this mass expectation of a miracle and the hope of healing in a supernatural way.

Subsequently, for treatment in a hospital there is a need to get a quota, wait in line, and often pay for procedures. But the patient really wants to believe in something magic could address his or her medical issues. When a person likes a decision a priori, he or she will adjust the facts to it. This caused a lot of people financial losses.

Reality real and declared (imaginary)

For instance, the legendary government program of regional gasification will be 20 years old soon. The people were promised gas pipeline coverage – above 90% of the territory, cheap gas in every village, etc. However, «for two decades Gazprom, a corporation with an annual turnover of half the state budget (6.54 trln RUB), which until recently was the worldwide largest energy company has not gasified even a third of the territory. Even on the threshold of 2025, Russia, the country with the world's largest reserves of natural gas, is in last place in Europe in terms of gasification. It inferiors to most of the former Soviet republics, including the Caucasus and Central Asia.

We consider more detail the actual reality in terms of science. We believe, the science is a factor determining in many ways possible reality in the future due to scientific and technological progress.

The term «scientific and technological progress» is in constant use by the leaders of our state. In 1999, was established the «Day of Russian Science» (February 8). Russian President V.V. Putin declared 2021 the Year of Science and Technology.

In 2016, the President of the Russian Federation approved the Strategy of Scientific and Technological Development of Russia. At the same time, V.V. Putin equated it with the National Security Strategy. By the decision of the President of the Russian Federation, seven priority councils and a coordinating council were created to unite their work. After the start of the special military operation in Ukraine, another term appeared in the lexicon of Russian officials – «technological sovereignty». This year, on the Day of Russian Science, the President of the Russian Federation stated that Russian scientists need to ensure country technological sovereignty in a short period.

However, technological sovereignty has been discussed before[1].

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[1] *Firstly, the Decree of the President of the Russian Federation on May 7, 2012. No. 599 «On Measures for the Implementation of State Policy for Education and Science». Secondly, Decree of the President of the Russian Federation No. 204 on May 07, 2018 «On National Goals and Strategic Objectives for the Development of the Russian Federation until 2024». The second of these Decrees defines 12 national projects; «Science» is the one of them. By next year, according to the Decree, the national Science project should*

The achievements of Russian science can be assessed using the annual statistical collection «Science. Technologies. Innovations». It is a joint publication of the Institute for Statistical Research and Economics of Knowledge of the Higher School of Economics, Rosstat and the Ministry of Education and Science of the Russian Federation. It contains a lot of international comparisons that allow us to understand the position of the Russian Federation in world science, technologies, and innovations (data from the OECD, Eurostat, UNESCO, Rospatent, the World Intellectual Property Organization, foreign national statistical services, etc.). The collection has been published since 2009.

However, this collection contains indicator: «The number of researchers by country (thousand person-years; equivalent to full-time employment)». This and other indicators, comparisons are made for 13 countries, which the authors of the collection attribute to the group of world science leaders («group 13») according to the totality of indicators are made. Russia is not in the top five. She is ranked 6th with an indicator of the number of researchers equal to 390.5 thousand. The top five countries are as follows, thousands:

1. China – 2,405.5; 2. USA – 1,493.1; 3. Japan – 704.5; 4. South Korea – 470.7; 5. Germany – 461.6. Russia is followed by: India – 341.8; France – 333.8; Great Britain – 317.5; Canada – 191.7; Brazil – 180.0; Taiwan – 167.8; Italy – 159.0.

Data are also available for 2000 and 2010. It allows us to determine the dynamics of the number of people engaged in scientific research. Over the period 2000-2022, some countries increased their population by several times.

However, in 2000, the number of people engaged in scientific research was 695.1 thousand; China lagged significantly behind the United States, which was the world leader. In 2000-2022, the number of researchers in China increased by 3.46 times. In the United States the number of people engaged in scientific research increased 1.53 times over the same period. Thus, in Brazil, the number of scientific researchers increased 3.5 times in 2000-2022; in India – almost 3 times; in Taiwan – 3 times; in South Korea – 4.4 times.

Unfortunately, Russia turned out to be the only country on the list in which the number of researchers not only did not increase, but even decreased. In 2000, 506.4 thousand people were engaged in research in our country; decrease of 23%.

The second indicator: «The number of researchers per 10,000 employed in the economy by country.» For 2022, of the 13 countries represented in the collection, the Russian Federation ranked 10th with an indicator equal to 55. It was followed by: South Korea – 173; Taiwan – 147; France – 114; Canada – 110; Germany – 103; Japan – 103; Great Britain – 101; USA – 110; Italy – 63.

Three countries ranked lower than Russia: China – 32; Brazil – 19; India – 9.

The third indicator: «Research and development costs by country (mln $ USD; calculated according to the purchasing power parity of national currencies)». In 2022, 13 countries according to this indicator were ranked as follows (in descending order): USA – 806.0; China – 667.6; Japan – 177.4; Germany – 153.7; South Korea – 119.6; Great Britain – 97.8; France – 77.2; India – 59.1; Taiwan – 55.6; Russia – 49.9; Italy – 40.1; Brazil – 35.9; Canada – 35.3.

Although Russia is considered the fifth economy in the world by the end of 2023 (in terms of GDP calculated according to the purchasing power parity of currencies), it ranks 10th in terms of R&D costs. Its R&D costs were less than that of small Taiwan (it ranks 21st in the world in terms of real GDP, i.e. calculated by PPP).

Although Russia and Germany are on the same level in terms of real GDP, German R&D costs in 2022 was more than three times higher than that of the Russian Federation. China's R&D costs are 13.4 times higher than Russia's; U.S. costs is more than 16 times higher.

The fourth indicator is «Research and development costs as a percentage of GDP by country». There are rating for 13 countries in 2022, data for 2000 are shown in parentheses for comparison: South Korea – 4.93 (2.13); Taiwan – 3.77 (1.91); USA – 3.46 (2.62); Japan – 3.30 (2.86); Germany – 3.13 (2.41); Great Britain – 2.91 (1.61); China – 2.43 (0.89); France – 2.22 (2.09); Canada – 1.55 (1.86); Italy – 1.45 (1.00); Brazil – 1.17 (1.05);

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ensure «the presence of the Russian Federation among world five leading countries engaged in research and development in areas determined by the priorities of scientific and technological development»

Russia – 0.94 (1.05); India – 0.66 (0.76).

Therefore, Russia was in the penultimate place in the list of thirteen in terms of the relative level of science costs. In addition, it was one of the three countries with decreasing of this indicator over the period 2000-2022.

In Russia – 1.05-0.94%; in Canada – 1.96-1.55%; in India – 0.76-0.66%.

But some countries in the period 2000-2022 showed a sharp breakthrough. In China, the indicator increased from 0.89 to 2.43%, i.e. 2.7 times; in South Korea – it is 2.3 times; in Taiwan – it is almost 2 times; in the UK – by 1.8 times. These figures indicate Russia's progressive lagging behind most other G-13 countries.

The indicators of innovative activity of organisations by country are interesting, too. However, Russia is considered in the context of another list. It also consists of 13 countries, but all countries (except Russia) are EU members. One of the indicators is «The share of innovation costs in the total volume of goods shipped, works performed, services (%)». Here is the ranking of countries: Sweden – 3.5; Germany – 3.5; Belgium – 2.8; Denmark – 2.5; Finland – 2.5; 6 France – 2.4; Austria – 2.3; Russia – 2.1; Norway – 1.9; Italy – 1.6; Spain – 1.4; Poland – 1.2; Romania – 0.5.

The indicator of innovation activity is «The share of innovative goods, works, and services in the total volume of goods shipped, works performed, and services (%)». The ranking of countries is as follows: Spain – 21.7; Finland – 19.3; Belgium – 15.1; Denmark – 15.0; Germany – 14.0; Italy – 13.8; Austria – 13.0; Sweden – 12.7; Poland – 7.5; France – 6.2; Norway – 6.0; Romania – 5.2; Russia – 5.1.

The indicator «The number of patent applications for inventions by countries». Here are the data for 2021. Moreover, the country's place is determined not in the context of the «G 13», but in the context of all world countries. In total, 25,472 patent applications were filed in Russia in 2021. They include 19,569 to the national patent office, and 5,903 to foreign offices. According to the total number of applications in 2021, Russia ranked world 14th.

China was leader (the number of applications was 1,538.60 thousand). It was followed by the USA (509.96 thousand), Japan (412.88 thousand), South Korea (267.53 thousand), Germany (165.83 thousand). Hence, Russia lags far behind many countries in terms of applications for inventions. The gap from China was more than 60 times, from the United States – 20 times.

Therefore, it is considered the progressive lag behind the world leaders. Although the latest data in the collection is mainly for 2022, it can be confidently stated that the goal of the National Science Project (to be ranked 5th in the list of world science leaders in 2024) has not been achieved.

Today, Russian science ranks world 27th. There is the degradation of science, if compared with its position in the world ranking 30 years ago and with the share of GDP for human development. Today, 75% of the population is living under the poverty line.

Therefore, the situation with scientific personnel in Russia is becoming more complicated. For instance, officials provide controversial information: the number of scientists is or decreasing, or growing, etc. There is no general opinion on results of Russia isolation in terms of SMO and international agenda.

At the end of 2023, Deputy Prime Minister D. Chernyshenko reported on stopping the trend of reducing scientific personnel, increasing the share of young scientists for the first time in the history of modern Russia. At the same time, the number of post graduate students has grown to 110 thousand; two thousand will receive a scholarship in the amount of 75 thousand RUB, established by presidential decree. The state actively supports young scientists: for example, the Russian Science Foundation has allocated funds to 708 organizations, and 86% of laboratories focus on new areas in science. Especially for young scientists the grants will increase to half a billion RUB.

At about the same time, the recent secretary of the Security Council of the Russian Federation, N. Patrushev noted on the following: «A serious obstacle to achieving technological independence is the shortage of qualified scientific, engineering and working personnel. The total number of personnel engaged in research and development in Russia has decreased by a quarter over the past 20 years.»

By the end of 2022, a study by the Institute for Statistical Research and the Economics of Knowledge, HSE has recorded an increase in all categories of scientific personnel. The total number of scientific staff in the

Russian Federation increased for the first time in a year to almost 670 thousand people – by 1.1%. However, the actual number of researchers increased by only 0.2%, and the largest increase was among laboratory assistants and other support staff. Compared to 2010, there were 67 thousand fewer scientific staff. The most curious situation was with young scientists; their number was steadily decreasing, suddenly increasing two years earlier. Indeed, the counting system has changed: previously, an employee up to 42 years old was considered «young», and today – up to 45 years.

Russia has remained in the top five world leaders in terms of the equivalent of full-time employment in science – this is a certain amount of time actually spent by staff on research and development. It has 737 thousand man-years in a year, and China, for comparison, 5.7 million man-years. We can consider notable scandal with young scientists from Novosibirsk in 2021, declared the Year of Science and Technology in Russia.

The winners of the presidential prize A. Proskurina, E. Potter, and E. Dolgova were invited to a meeting of the Council for Science and Education with the participation of the President V.V. Putin. He asked young scientists about their salary, and A. Proskurina, a senior researcher at the Institute of Cytology and Genetics SB RAS, answered her salary was slightly higher than the subsistence minimum – 25 thousand RUB. Although her position is quite high, by the age of 35 she has been at the institute for 16 years.

Salaries in science, as instructed by the president, amount to more than 200% of the average in the region. And the average for the Novosibirsk region was 39 thousand RUB. The president remarked her salary should be almost 78 thousand RUB.

Indeed, the salaries of scientists are increased, but employees became part-time workers, with the same duties as full-time ones.

The thousands of Proskurina's colleagues began to confirm her words with articles, posts, interviews: according to them, 40 thousand RUBs young scientist can have only participating in the grant programmes. By N. Savelyeva, a programmer at the Space Research Institute of the Russian Academy of Sciences (Moscow), her salary was slightly more than the minimum wage – 13.7 thousand RUB. But when she became a part-time worker, she had to get 6,888 RUB without any additional grants. However, Olga, a laboratory assistant at the Institute of Higher Nervous Activity and Neurophysiology, assured that she works at 0.1% and receives «less than 1,500 RUB per month». Nevertheless, according to official reports, the salaries of scientists are much higher than the average for the region; in Moscow in 2020 amounted to 88.9 thousand RUB.

Indeed, for any bureaucratic system it is easier to actually address a problem than to create a myth. There appeared an idea to establish several funds to provide financial support to the scientific activity. It allows ones to reduce bureaucracy level.

It also allows ones to reduce governmental cost control, simplify the terms of funding, and results control, etc. This model is implemented all over the world and pays attention on the research results – further funding is provided only in case of positive scientific forecast.

Otherwise, the economic situation became negative one. By 2023, total costs by the state program «Scientific and Technological Development of the Russian Federation» amounted to 1.2 trln RUB, of which 559 billion will be spend on R&D. But in 2020, the same 1.2 trln RUB were spent on science from the budget. However, the inflation level increased significantly. Moreover, the most equipment and materials have to be bought indirectly and by the higher prices. Therefore, science will receive less than 1% of GDP from the state, while advanced countries spend 5%.

It causes increasing of budget cost control.

In 2021, the functions of the Russian Foundation for Basic Research (RFBR) were transferred to the Russian Science Foundation (RNF). It causes the reduction of funding, changing of the grant appliance system, etc.

The RFBR was created on the model of the American National Science Foundation: any group of scientists no more than 10 people can apply and receive a grant. Applications were assessed by experts; approvals from various ministries and departments were not required.

According to many famous Russian scientists, RFBR grants allowed fundamental science to survive in

the 1990s. Indeed, when the financial situation in the country was improved, Skolkovo, the Russian Science Foundation, and other government tools to support science appeared. The Russian Science Foundation specialised in supporting prominent scientists: individual grants of 5 mln RUB per person, 30 mln RUB per laboratory. Otherwise, RFBR supported young scientists allow them to be prominent in the future due the governmental support. Then bureaucrats from science decided to reduce their funding, and concentrated on prominent scientists only.

However, in 2022, national security began to directly depend on science. The country needed thousands of drones, and the most sophisticated military equipment needed domestic components. It is necessary to upgrade existing weapons systems rapidly and create new ones in extra short period of time. Therefore, funding of young scientist research is essential not only during the war-tame but during the peace, too.

Part 2. Free will and fate as a category of economic science
Section 2.1. Fate
Russian culture and nation have a lot of enemies. They try to dehumanise us, erase our Russian cultural code, provide tolerant globalisation, destroy the family values, etc.

We must to create a new Reality, the civilization of the Future. Because Russians have no prospects in this modern worldwide coordinate system. Russians have their own destiny unlike those of Americans and Europeans. The history of old Russia is over and there is a need to create a new one. Otherwise, Russians will vanish as a nation.

It is possible to create a new reality in Russia. According to K. Paustovsky, «there is nothing more disgusting than a person's indifference to his country». Person got this feature, when his or her conscience and sincerity disappeared. The meaning of human life disappears. To prevent this, we need to construct new reality, new economic efficiency, and social justice with personal freedom (J.M. Keynes).

The development of economic theory includes in its object the reality itself, the way of «existence», in philosophical terms, as a personal and essential being of economic phenomena and processes. Reality concerns each single person and society as a whole.

Section 2.2. The methodology of economic knowledge as a rule
Reality and reality correlate as otherness and the world, as the worldview of artificial time and constructed space.

Ontologically, reality is dynamic conservatism, and reality is non-future. Methodologically, the word «anastasia» (from Greek «resurrection»); resurrection for understanding reality as reality means the transformation of life, transfiguration, and the acquisition of new properties of life. Additionally, economic relations are deformed and change their characteristics at all levels of the common economic space. We previously consider the issue of the common economic space.

Therefore, data on physical economy (economophysics) in modern economic theory could be considered in terms of the future reality.

Hence, the inevitability of Russian economy transformation based on a new economic theory, has already been described in a number of publications [4].

Also we consider the declared reality.

At the fifth International Moscow Academic Economic Forum (IIEF-2023), the topic of discussion was the problem of «Russia's role in the new economic reality» from the perspective of global economic development trends. The main attention was drawn to «education as the foundation of the future». For instance, the Vice-President of the Higher School of Economics, I. Agarzimyan considers new economic realities, too.

Indeed, the Russian Academy of Sciences is integrated into the process of making state strategic decisions (see Table 1).

Knowing reality allows ones to create a world. Understanding reality in economics destroys the concept of «homo economicus».

The imaginary reality is something that has not happened in the economy yet.

Table 1 – Strategic decisions making

Strategy of scientific and technological development	Information technology
Objectives of the updated Technological Development Strategy: • independence in preserving the healthcare and food security; • technological sovereignty in the production of machines and machine tools, robotics, types of transport, unmanned aircraft, marine, and other systems, data economics, new materials, and chemistry; • We believe, a long-term order for high-tech products will be formed until 2030. It allows ones to create globally competitive products based on unique domestic developments, including space, nuclear and new energy technologies. Otherwise, companies-producers could follow the governmental order. The total investments of the state and business in R&D should be more than doubled; they should amount to 2% of GDP by 2030.	By 2030, it is necessary to form digital platforms in all key sectors of the economy and the social sphere. These and other complex tasks will be addressed within the framework of the new national project «Data Economy». At least 700 bn RUB will be allocated for its implementation in the next six years. One of the goals is to increase the revenue of the top 100 Russian IT companies by 2.5 times, to 5.3 trln RUB; the country's GDP growth should amount to 11.2 trln RUB due to artificial intelligence technologies.

Source: Volnaya Economika [Free Economy]. January-March, 2024. p. 26.

There is an issue of declared reality and reality factual.

Therefore, we note the existence of a time plan for IT singularity (see Fig.1).

2023-2025
Reaching the quantum dimensional limit of traditional silicon chips. The boom in multiprocessor devices and special software to control them. 5G/6G networks. The drone boom.
2025-2027
AI as a standard element of production and transport systems. AI-driven warfare. Demonstration of quantum superiority in practice.
2027-2030
The transfer of managerial functions to AI. Meta-universes as a basis for "indirect propaganda" of the centres of power". Photonic computers.
2060-2035
Spreading a simple neurointerface. Quantum computers. "Integrated Reality" without the option to verify the "true" one. "Internet of Everything".
2034-2040
Advanced AI, undifferentiated from humans' in communication. Advanced UM systems controlling AI systems. AI for specific tasks. A rejection of the protraceability of AI.
2040-2043
A complex neurointerface. The proliferation of psychochemistry that simplifies human adaptation to functioning in the digital world. "Grey markets" of neuroprosthetics.

Figure 1. Timeline for IT singularity

Source: Volnaya Economika [Free Economy]. January-March, 2024. p. 43.

Basic concepts of reality

Properties of reality as an economic category:

– collective hallucinations;

– the disappearing truth verification;

– imagination becomes stronger than knowledge;

– growing distrust of information;

– the problem of assessment guidelines;

– reality the emergence of Homo cofucus;

– the emergence of a hybrid world of material and virtual digital reality;

– the development of synergetics as a theory of complex systems.

However, the condition for the perception of reality in economics is primarily a non-consciousness. The same is required for the long-term perception of turbulent reality.

Methodologically, we agree with A.A. Ukhtomsky – there is no subject without an object, and vise versa.

In addition, it becomes possible to analyse the process of education as a spiritual work within the framework of an approach to economic time as a spiritual work. And since today we do not know what consciousness is, the reality of economic knowledge is the creation of an economic theory of education, in which the products of educational production become not only education, upbringing, faith in the future, but also consciousness as an image of education. The methodology of economics is complemented by the principle of mentology to characterise the level of consciousness.

– The inflation problem continues to escalate in Russia, indicating persistent fundamental problems in the economy and promising a new cycle of monetary policy hardening. It will have a negative impact on economic growth and investment. The situation is complicated by starting the tax reform, depriving businesses of investment resources.

– The global economy is facing geopolitical challenges. It entails a situational increase in oil prices, which, however, promises to preserve Russia's oil and gas revenues.

– Western countries are working on new sanctions measures designed to reduce Russia's revenues from energy exports and expand the number of sanctioned businessmen.

Therefore, the Russian fate becomes an economic category. Moreover, fate is a certain social capital, the position of changing oneself and the world, including a common economic space. Yes, it is definitely biased, but this is our kind of «the truth».

Indeed, only the formulation of methodological principles and methods of analysis allows scientist to show his or her fate to everyone. Therefore, the future of fate concerns with understanding the existence of certain restrictions on the choice of principles and methods. However, motives often used in such cases for obtaining tactical successes, which are possible at moments of favourable scientific conditions, are not suitable for us due to the understanding that, ultimately, the real results will not coincide with the declared ones.

Section 2.3. Fate

Fate as social capital is a kind of economic resource; it is a kind of the national value. Fate is the source (one of) the formation of a new reality. One of its characteristics is the perception of a person not as homo-economicus, but as a non-economic, collective, but still individualized personality, regardless of nationality. The noonomic image of a person is an image of a future reality. For such an image to become reality a lot of changes are required and the beginning lies in a change in the educational sphereю It causes the gaps in the blind spots of the educational space [13]. It is necessary to consider digital transformation in terms of human values. The necessary kind of V-transition (according to O. Bakhtiyarov) is transition in terms of fate.

The V-transition will make it possible to replenish the resources that were previously drawn from the demographic compression of Russia, when there were many people – up to the Great Patriotic War. A huge number of people disappeared during the pre-Soviet and Soviet regimes. And we have a demographic funnel – there will be a shortage of people. In order to have enough of them, we need specific people who are able to change themselves, their condition. Therefore, part of the conservative revolution, the conservative revolutionary ideology, is precisely a personal revolution. Education and cultural systems must be changed. A person should be aware inside, act as a conscious person, not as a part of a system only.

Therefore, fate as an economic category forces us to consider in more detail the problem of the methodological foundations of our analysis.

Section 2.3.1

The methodology used in the analysis of reality as an economic phenomenon or as a state of the common economic space it is comprehension the state as the goal of a universal, general goal of economic activity.

Obviously, the very term of reality for economic analysis requires filling its specifics with content. However, there is a philosophical aspect of the issue. There is a sufficient variation in the context of the use of the term «reality» in the literature.

Many researchers use the following terms:

O.B. Lemeshonok – «geo-economic reality» (report on SPEC-2022).

Y.M. Osipov – «the unfolding reality».

A.V. Buzgalin is a «new reality».

A.I. Agarzimyan, considering the new economic realities of the era of the fourth Industrial Revolution, in the article «Unemployed or carefree» reflects on tomorrow's reality. He notes «the era of the fourth industrial Revolution is a time of mass introduction of automated systems. Civilization has always strived for technological and economic development, the search for new knowledge and solutions to facilitate human labour. When quantitative changes turned into qualitative ones, a fundamental turning point occurred. It was later called the industrial revolutions. Our generation passed through a «perfect storm», a period of completion of several development cycles of different lengths at once. Nowadays, the emergence of a global robotic environment is taking place. It will be able to replace human labour with automatic one. Perhaps this will be the biggest change in the history of mankind».

We agree with his assessment of the future reality.

The strategy of retraining personnel in previous industrial revolutions has not shown high efficiency. However, now the level of education has become higher, the information and communication environment is functioning. In the new reality, low-skilled physical labour will remain in demand: progress here is not yet economically justified. The demand for highly qualified specialists will also be stable – it is technologically impossible to replace them. Indeed, the modern middle class as the most vulnerable; in the expert community in recent years, the term «washing out the middle class» appeared.

A significant part of professions previously considered intellectual ones transferred into the field of working according to templates, instructions, and regulations. In the middle of the 20th century, an educated and capable engineer was part of the professional elite. At the beginning of the XXI century, his work can easily be repeated by an AutoCAD user. Nowadays, technological units and structures are already calculated automatically, while the result is often much better and more efficient. As for high-level and complex engineering skills, only a few hundred people in the world are skilled enough. They are creating modules used by millions of ordinary engineers. Indeed, this situation is typical for most industries. Professions do not disappear – they are transforming, changing themselves. It also is changing the role of education.

There is a real need to methodologically strengthen the systemic principle of spatiality.

Discussion

A fundamental change is possible only in case of a new policy in the field of education developing. In particular, the teaching of all applied economic disciplines (there are more than 30 of them) should have a base in the form of a general economic theory. Those should be interpreted as a fundamental ideological discipline with the appropriate content.

On the one hand, the concept of economics is a kind of bestiary: many concepts are absent (price, economic growth, GDP), others are more demanded (efficiency, optimization, intellectual property, labour productivity). A special scientific operation is needed to complain the conceptual apparatus with reality to except its destructiveness.

Obviously, updating the methodology of economic analysis is very controversial. It could have an

imitative and formal character, especially at first, when the positions of the participants in the discussion may differ diametrically. But it is quite relevant and necessary.

Conclusions

1. Reflections on reality in economic theory are caused by changes in the nature of economic relations in society, where information as a factor of production begins to prevail over all other factors. Consequently, there is a change in the productive forces of society and the formation of nanoeconomics, which requires special theoretical research based on new methodological foundations. According to D. Bell, fundamentally new role of theoretical knowledge in a special form becomes a factor determining the direction of social development.

2. Education is the source of a new era. The education financing is the history of future reality. However, the Russian Federation ranks world 98th in terms of education financing. And the history of civilization is a change of economies: agricultural, industrial, service, information, etc. Ignoring science will cause a failure to enter a new stage (form) of economy – the educational economy (the economy of people as carriers of natural intelligence), in which human capital will become a reality concentrator.

Concentration is interpreted as the living energy of a person. The lack of an educational economy is a kind of gap for human world globalisation. The search for the right approaches to understanding reality in economics allows us to make the following statements.

– Moreover, this reality includes the development of Karl Marx's ideas on the economic relations of Man with Nature. Noonomics could be the foundation for the development of these ideas in terms of the society without capitalism within the framework of a post-Christian civilization.

– Understanding reality in economics is inextricably linked with understanding the meaning of the concept of reality.

3. Examining reality in economic science involves highlighting its characteristics such as the dependence of economic success on the cultural environment of economic relations, changing dynamically. Perhaps, reality in its manifestations as the value of self-survival and self-development of individuals, as well as the reduction of distance to power on the basis of the sacralisation of fear as a secular-institutional value. The above-stated provisions are confirmed by the propaganda of Nazism in the West. The Nazi ideology in its Europeanized form was developed and disseminated by the Centre for Information and Psychological Operations (CIPsO). It is operated by the 77th Special Information Operations Brigade from London. About fifty PR agencies and hundreds of high-level specialists who know the Russian language and culture well work for this team. The Centre has large financial resources.

CIPsO is part of the army structure of the Social Operations Forces of Ukraine (SSOU) and initially controlled the information agenda only on the territory of the country, then undertook to form it outside Ukraine. The training of the Centre's staff in propaganda was conducted according to American methodological manuals. They were focused on manipulating feelings and fear, creating reality with the help of television, disabling historical memory, spreading an atmosphere of immorality.

As a result, there is a collective depression, the bias of some towards others and reality as a habit with other things being equal. The feeling of reality in this case begins to depend on the mentality. The reality of the worldview becomes a hallucination, the principle prevails: everyone has their own truth, that is, their own reality; there is an inflation of feelings, an emotional beating of the brain. As a result, there is a cognitive impairment of the brain. This reality becomes easy to manipulate to. The reliability of the information is questionable. Individuals' trust in authority is decreasing.

Therefore, we can formulate the purpose of the conclusion as an adaptation to a new reality, emphasize its novelty, and thereby take part in the creation of a new economic science. However, human capital should be considered as a criterion for educational production effectiveness. It should define reputational pedagogical technologies costs and reputational capital. Moreover, the long–term reality changes the relationship of economic theory and practice to work and the pyramid foundation to education.

4. The socio-economic trajectory of Russia's development is characterised by the categorical imperative

of being in time and space. This fact has already been discussed at scientific conferences (for example, at Tver State University, SPEC-2023, SPEC-2024, V MAEF), and in scientific literature [2]. The economy of the mid-21st century will be different from those of the first quarter of the 21st century. Development based on the principles of noonomics is a model allowing society to be made more equitable. Moreover, our country is being able to withstand the new reality. Reality in economic theory can arise through considering the future of will, future of fate, and understanding theoretical economics as the pure economics of a topology object or a number polygon. This is an economic necessity today.

5. By economic necessity, we consider specific economic and social conditions (including forms of goods and services production, state policy, institutions and ideological motivation of all participants in social production).

6. The reflection on noonomics metaphysics as a continuation of transfinite sets theory. The death of the dream of justice causes a crisis in the value system and elites moral degradation. The loss of the coordinate system causes the loss of the country's development and balance between human development and the accumulation of personal capital by the elites. This is stated by the most honest scientists [6].

7. In this context, noonomics can be considered as a development model with a tunnel effect, being the result of the functioning of social labour (according to K. Marx – the «universal productive force».

8. The density of economic relations in the modern world is increasing, but the role of nanoeconomic relations is weakening.

9. The economic systems become the subject of analysis in economics instead of economic relations because economic systems are easy to explore. They do not have subjects of economic relations (people), only agents – mechanical elements of transmission of transformation mechanisms (processing), but there is no goal. There are elemental acts of technical (or physic-chemical transformations of one state of the process factor into another). Therefore, system analysis studies the state of system economy, the kinetics of processes occurring in economic systems and the mechanisms of these processes. Understanding the kinetics of processes and economic phenomena provides actual control the production process of an economic product (material). However, non-physical products as products of elementary economic relations, such as the transformation of human energy into a creative process remain a complicated issue.

Perhaps, it is the reason the concept of «industrial relations» was replaced from political economy by the concept of «economic relations» and structured by L.I. Abalkin on economic, organizational, technical, economic, and socio-economic ones. Perhaps, it is the reason of difficulties in determining the content of human capital, social capital, etc.

10. However, the subject of political and economic relations in economic time and economic space, economics cannot exist with opposing «inclusive capitalism». The common economic space is not only a global system of economic interdependencies. It encompasses all national economies, includes international division of labour and various forms of interaction at the level of productive forces, industrial relations, and the political and legal superstructures.

The concept of geopolitics includes the understanding of the world as a whole outside of its differentiation into countries, states, etc. Economic production distinguishes nanoeconomics, noloeconomics, mesoeconomics, microeconomics, macroeconomics, subconomics and, finally, megaeconomics.

According to G. Kleiner, «economic conflicts between labour, capital, knowledge, investments, etc. on occur at the micro level, at the enterprise level. Nowadays, the life of a huge number of enterprises is under threat. They are now practically transforming their processing and other procedures. It is a large risk for them. In addition, the shortage of personnel also makes the situation at enterprises more complicated. There are some unqualified replacements in terms of people, components, and technologies».

11. The economy of the mid-21st century will be different from those of the first quarter of the 21st century. The development based on the principles of noonomics is a model that allows society to be made more just, and our country to be able to withstand geopolitical confrontation in an era of drastic changes.

According to the law of the reverse perspective of parallel reality, the events of modern times immediately happen in reality, will not be realized.

We believe, a long-term order for high-tech products will be formed until 2030. It allows ones to create globally competitive products based on unique domestic developments, including space, nuclear and new energy technologies. Otherwise, companies-producers could follow the governmental order.

The total investments of the state and business in R&D should be more than doubled; they should amount to 2% of GDP by 2030.

By 2030, it is necessary to form digital platforms in all key sectors of the economy and the social sphere. These complex tasks, such as self-knowledge, are relevant to self-knowledge by every person. At the same time, noonomics as a concept does not justify any obvious solutions to current financial and budgetary problems. It characterizes its long-term validity as a theoretical trend in the development of economics. Therefore, the concept of Noonomics by S.D. Bodrunov is associated with the search for a new strategy for the development of society.

In the absence of a holistic and relevant economic science, technological achievements cannot become innovations: the decisions made are subjective; they reflect the level of personal and administrative preferences, rather than a balanced assessment of the achieved systemic economic effect. Economic solutions in the conditions of rapid development, expansion and complication of the super disciplinary knowledge space, convergence of technologies require a special system of systematic research, the main seven groups of which include repeated, continuous, network, translational, and transformational research, complemented by future complex research.

The development of a new model requires the formation a new economic science competitive in conditions of rapid scientific and technical development of complex systems.

Nowadays, the economy is a mechanism for the self-destruction of mankind. The reality of economic theory arises through its diffusion into physical economics and the methodology of quantum physics.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION
Vasiliy V. Chekmarev – conceptualization, project administration, writing – original draft.
Aleksei S. Bakhmetov – formal analysis; writing – review & editing.

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