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Division of Powers of Public Authorities in Modern Conditions

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ABSTRACT

In the context of the implementation of the provisions of the Constitution of the Russian Federation regarding the formation of a unified system of public power, the issue of improving the delimitation of powers of public authorities remains relevant. Significant amount of problems has been accumulated over the course of more than twenty-five years. This fact has an impact on the sustainability of regional budgets. The author of the article is considering the authority of regional government bodies in questions of joint jurisdiction of the Russian Federation and its constituent entities. The **purpose** of the work is to develop recommendations for improving the division of powers of public authorities and financial support this process from the position of increasing the sustainability budgets of the constituent entities of the Russian Federation. In the course of the work, based on scientific **methods** such as institutional, retrospective and comparative analyses, it was concluded that there are problems in the mechanism for delimiting regional powers that impede the increase in the sustainability of regional budgets. The main **results** of the study include suggestions for the harmonization of budget legislation and legislation in the field of delimitation of powers from the position of expanding the rights of regions to participate in the implementation of non-transferred powers, regulation of the process of introducing new powers, inventory count of regional powers established by subordinate legislation or by-laws, introduction of the practice of financial support for certain regional powers in cases and to the extent of receipt of certain non-tax revenues and the development of debt financing instruments for powers, as well as for improving the practice of financial support for delegated powers. The prepared recommendations may be useful when conducting the inventory count of regional powers from the standpoint of increasing the sustainability of regional budgets; introducing a reasonable assessment of the resource provision for new powers proposed for the implementation; shifting the emphasis from the subordinate or by-law regulation of regional powers towards strengthening their legislative regulation.

Keywords: Subject of joint jurisdiction; authority; region; public authority; budget; regional budget; sustainability; sustainable financing

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INTRODUCTION

The delimitation of the subjects of competence of governmental units or public-law entities (hereinafter — PLE) and the powers of public authorities or executive government agencies (hereinafter — EGA) is one of the strategic directions in the development of a unified system of public power in the Russian Federation and foreign countries. Depending on whether the balance in this issue is achieved, the fiscal policy will be organised in order to increase the sustainability of public-law entities' budgets. [1].

The analysis of foreign experience in the area of delimitation of subjects of competence allowed to establish the following features of state activity, including in the spheres of governance, social policy, financial and credit and others.

In particular, if we talk about the organisation of public power as one of the fundamental areas of public administration, most countries retain the exclusive competence of the federation in the issue of the organisation of federal power [2]. In the constitutions of some states, the subject matter of the federation includes the problems of creation and coordination of a unified system of public authority (Mexico), as well as aspects of public service. At the same time, only in some countries these issues are included in the subject of joint competence (Germany, Mexico).

Foreign policy by foreign countries is traditionally referred to the competence of the federation or to the subject of joint jurisdiction; however, in some countries there are some peculiarities. In the People's Republic of China, the Hong Kong and Macao administrative-territorial units have the authority to interact with other states in the field of culture [3], as well as with regions of foreign countries on a wide range of issues [4].

Defence tasks are national tasks, with the federation retaining exclusive competence. At the same time, the experience of some countries shows that such issues can be included in the joint competence, as in the Comoros and Somalia, for example [5].

According to the constitutions of foreign countries, the social sphere is included in the subject of jurisdiction of the federation, but sometimes it is a subject of joint jurisdiction (Malaysia). Health care as one of the most important sectors is legislatively enshrined in the constitutions of most countries as a subject of joint jurisdiction, within which powers are delimited by types of medical care. However, for example, in Canada, there is a tendency to attribute the issues of medical care to the competence of the regions, while the federal level retains only the function of normative regulation.[1]

The financial and credit system of foreign countries is a subject of competence of the federation or a subject of joint competence (Germany, Italy) [6]. Antitrust regulation is traditionally the sphere of competence of the federation, but, for example, in Germany and India, serves as a subject of joint competence [7].

The delimitation of powers in economic sectors in most countries is realised in the following way: communications is a federal subject of competence (Australia) or a joint subject of competence (Bolivia, Nepal) [8]; hydropower, thermal power, renewable energy sources — mainly a subject of joint competence or federal competence (Nepal); cartography — a federal subject of competence; agriculture and agrarian policy — mainly regional competence; as for transport, the delimitation is carried out by its types [9].

DELIMITATION OF COMPETENCES AND POWERS — CURRENT STATUS

Recently, the delimitation of powers in the Russian Federation has undergone a number

[1] The Canada Health Act. R.S.C., 1985, c. C-6. Justice Laws Website. URL: https://laws-lois.justice.gc.ca/eng/acts/c-6/page-1.html

of significant transformations affecting the issues of regional development.

In 2020, Article 71 of the Constitution of the Russian Federation introduced changes related to the organisation and functioning of public power, including amendments to 7 out of 18 federal subjects of jurisdiction [10]. 4 out of 15 subjects of joint jurisdiction were adjusted, including in connection with the inclusion of agriculture, youth policy and clarification of health issues included in the subject of joint jurisdiction.[2]

In order to bring the legislation in line with the Constitution of the Russian Federation, including in connection with the alignment of the system of public authorities, amendments have been made to the issue of the organisation of legislative (representative) and executive government agencies of the constituent entities of the Russian Federation (hereinafter — the CERF). In particular, Federal Law No. 184-FL of 06.10.1999 "On General Principles of Organisation of Legislative (Representative) and Executive Government Bodies of the Constituent Entities of the Russian Federation" (hereinafter referred to as Federal Law No. 184-FL)[3] which had been in force since 1999, was replaced by Federal Law No. 414-FL of 21.12.2021 "On General Principles of Organisation of Public Power in the Constituent Entities of the Russian Federation"[4] (hereinafter referred to as Federal Law No. 414-FL).

[2] Constitution of the Russian Federation (adopted by popular vote on 12.12.1993, with amendments approved in the course of all-Russian voting on 01.07.2020). Art. 72. URL: https://www.consultant.ru/document/cons_doc_LAW_28399/?ysclid=lt5xi3cfew687366061

[3] Federal Law of 06.10.1999 No. 184-FL "On General Principles of Organisation of Legislative (Representative) and Executive Bodies of State Power of the Constituent Entities of the Russian Federation" (latest edition). URL: https://www.consultant.ru/document/cons_doc_LAW_14058/?ysclid=lt5xovk1o4917193708

[4] Federal Law of 21.12.2021 No. 414-FL "On General Principles of Organisation of Public Power in the Constituent Entities of the Russian Federation". URL: https://www.consultant.ru/document/cons_doc_LAW_404070/?ysclid=lt5xm68cr3971833502

The analysis of changes in regional powers on the subjects of joint jurisdiction has shown that in the period from 1999 to 2004, the initial version of Federal Law No. 184-FL envisaged 41 regional powers of mainly social character [11], and in 2005–2022 their composition was repeatedly changed with the general trend to increase their number [12]. In 2023, as a result of the adoption of Federal Law No. 414-FL, the total number of regional powers on the subjects of joint jurisdiction totalled 170 (*Fig. 1*).

A comparative analysis of the earlier and current federal laws in force has shown that:

- 71 regional powers from those previously enshrined were retained unchanged;
- 68 regional powers were clarified, with editorial amendments made to 15 of them, expansion amendments to 29, and narrowing amendments to 24 regional powers from those previously in force;
- 2 regional powers were deleted;
- 29 new powers added.

A detailed study of the existing regional powers on the subjects of joint jurisdiction has shown that they were clarified for the purpose of expansion or contraction by means of consolidation (4 regional powers were consolidated to 2) or splitting into two or more [19 divided in connection with the formalisation of issues of state control (supervision) into independent powers].

Federal Law No. 414-FL predominantly retains the previously existing regional powers, but at the same time adds new ones and expands the already established ones. Along with the improvement of the legal regulation of the delimitation of powers provided for by it, the practice of establishing powers of executive government agencies of the constituent entities of the Russian Federation has been preserved and enshrined in other legislative acts, which have also been amended to bring them in line with Federal Law No. 414-FL [11]].

The total number of powers of executive government agencies of the constituent entities

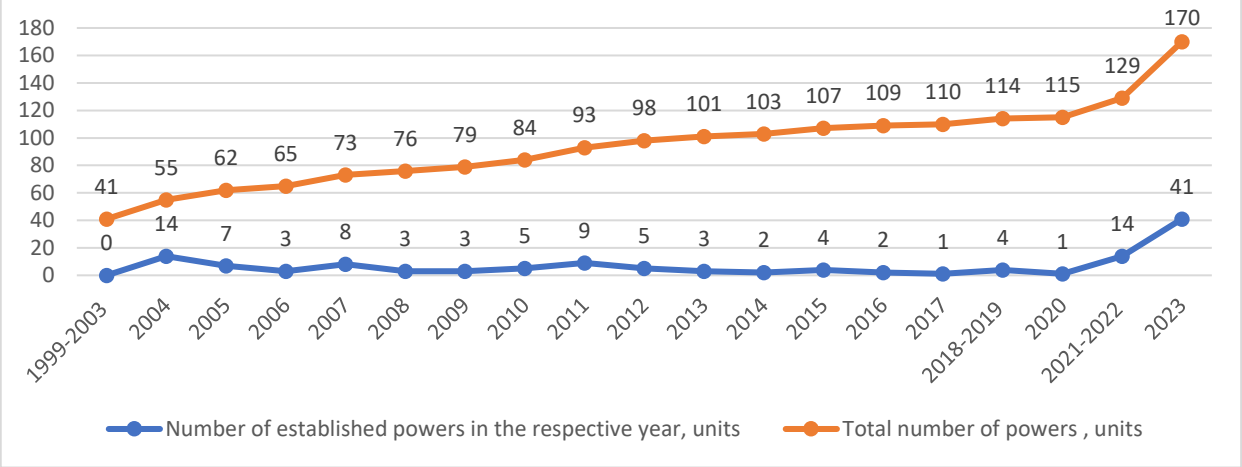

Fig. 1. **Dynamics of changes in the total number of regional powers on subjects of joint jurisdiction from 1999 to 2023**

Source: compiled by the author based on [13].

of the Russian Federation provided for by 126 federal laws to date is about 864.

According to Article 44 of Federal Law No. 414-FL, the list of regional powers on subjects of joint jurisdiction may be adjusted by amending it. This provision means that the establishment of new regional powers by other federal laws is possible if they are consistent with Federal Law No. 414-FL.

In addition, this legislative act provides that federal laws that address the issue of regulating the powers of executive government agencies of the constituent entities of the Russian Federation must contain provisions regarding their rights, duties and responsibilities, the procedure, and sources of their financial support.

At the same time, a selective analysis of regional powers has revealed the practice of their identical consolidation by Federal Law No. 414-FL and "sectoral" federal laws. For example, the regional authority in the field of protection and promotion of capital investments provided for in paragraph 62 of Part 1 of Article 44 of Federal Law No. 414-FL fully duplicates the regional authority already established in Part 7 of Article 4 of Federal Law No. 69-FL "On Protection and Promotion of Capital Investments in the Russian Federation".[5] The same can be said about the powers in the sphere of subsoil exploitation (clause 79), industrial policy (clause 147), use of hunting grounds (clause 167), information security of children (clause 168)[6] etc.

KEY DIRECTIONS IN THE DEVELOPMENT OF LEGISLATIVE REGULATION AND FINANCIAL SUPPORT IN THE AREA OF DELIMITATION OF POWERS

In order to further improve the delimitation of powers between public authorities, it seems advisable to form a number of recommendations and, in particular, to establish that Federal Law No. 414-FL (and this fully correlates with the main subject of its regulation) provides for a basic list of regional powers on subjects of joint jurisdiction. At the same time, it is recommended that "sectoral" federal laws

[5] Federal Law No. 69-FL dated 01.04.2020 "On Protection and Promotion of Capital Investments in the Russian Federation" (latest version). URL: https://www.consultant.ru/document/cons_doc_LAW_349045/?ysclid=lt6y0pujk9904455288

[6] Federal Law of 21.12.2021 No. 414-FL "On General Principles of Organisation of Public Power in the Subjects of the Russian Federation". Art. 44. URL: https://www.consultant.ru/document/cons_doc_LAW_404070/?ysclid=lt5xm68cr3971833502

disclose a detailed list of provisions characterising the basic authority, as well as the rights, duties, and responsibilities of regional authorities. It is not advisable to maintain the practice of duplicating regional powers in two federal laws. In addition, for the purpose of a uniform approach, it seems important to specify what exactly should be understood by the words: "organisation", "participation", "provision", "implementation", "support" used in the framework of powers.

The results of the analysis of the practice of delimitation of powers on the subjects of joint jurisdiction in the relationship with regional state revenues are presented in *Table 1*.

The data of *Table 1* show that the growth rate of total revenues as of 1 January 2023 is 113.12%, and the maximum positive dynamics in terms of non-tax revenues is — 142.80%.

It should be noted that not all tax revenues tended to increase: in terms of gratuitous revenues there was a decrease in the growth rate to 97.37%. In general, the identified trend does not confirm significant or even sharp changes in the performance of regional budgets in terms of revenues.

Decrease in the actual execution of regional budgets by revenues in 2020–2022 was observed in 13 regions; as of January 1st 2023, negative dynamics was characteristic of 12 of them (*Table 2*).

In most regions the growth rate of budget execution as of 1 January 2023 was not more than 110%; under-fulfilment was observed for some revenues, which was due to the influence of macroeconomic, political, and other factors, as well as inaccuracy of the methods of budget forecasting of revenues used.

Due to the fact that as a result of the improvement of the delimitation of powers on subjects of joint jurisdiction by virtue of Federal Law No. 414-FL, regional authorities have been vested with new powers, the issue of mobilising sources of their financial support is quite acute.

Table 1

Information on the execution of regional budgets by income from 2020 to 2022

No p.p.	Indicator name	2020	2021	Growth rate, %	2022	Growth rate, %
1	Total revenues, RUR mln.	13 253 645.61	15 676 412.93	118.28	17 571 705.40	112.09
1.1	Tax and non-tax revenues, including:	9 149 508.94	1 1781 364.98	128.76	13 326 745.44	113.12
1.1.1	Profit tax on organisations	2 910 490.73	4 501 302.93	154.66	4 663 603.64	103.61
1.1.2	Personal income tax	3 344 636.65	3 802 992.39	113.70	4 423 697.68	116.32
1.1.3	Excise taxes	755 169.08	900493.24	119.24	1 055 856.74	117.25
1.1.4	Tax on property of organisations	901 671.69	956 417.61	106.07	1 114 357.61	116.51
1.1.6	Mineral extraction tax	77 995.17	94 352.06	120.97	123 601.41	131.0
1.1.7	Other tax revenues	614 470.34	791 162.99	128.76	927 986.35	117.29
1.1.8	Non-tax revenues	459 263.06	630 828.56	137.36	900 798.77	142.80
1.2	Gratuitous receipts	3 776 207.84	3 676 792.95	97.37	3 922 587.21	106.69

Source: compiled by the author based on iMonitoring. URL: https://www.iminfin.ru/areas-of-analysis/budget/otdelnye-pokazateli-ispolneniya?territory=45000000 (accessed on 18.07.2023).

Table 2

Information on the execution of individual regional budgets by income from 2020 to 2022

No p.p.	Region name /	2020	2021	Growth rate, %	2022	Growth rate, %
1	Chukotka Autonomous District	51 836.02	51 237.59	98.85	50 229.61	98.03
2	Kaliningrad Region	124 500 813.0	122 216.71	98.17	115 872.53	94.81
3	Republic of Crimea	209 449.02	197 716.26	94.40	260 502.09	131.76
4	Jewish Autonomous District	19 283.59	22 431.69	116.33	21 553.64	96.09
5	Magadan Region	47 713.68	51 735.95	108.43	47 371.95	91.56
6	Republic of Sakha (Yakutia)	249 785.16	320 787.01	128.43	319 635.05	99.64
7	Vologda Region	99 823.06	142 589.77	142.84	132 026.77	92.59
8	Murmansk Region	87 999.07	118 651.09	134.83	105 966.48	89.31
9	Krasnoyarsk Region	28 8697.92	395 779.60	137.09	372 364.07	94.08
10	Tyumen Region	168 792.67	249 290.45	147.69	239 421.32	96.04
11	Chelyabinsk Region	198 009.43	274 401.54	138.58	252 712.06	92.10
12	Belgorod Region	111 375.86	158 754.03	142.54	138 471.61	87.22
13	Lipetsk Region	73 342.10	113 211.53	154.36	93 549.48	82.63

Source: compiled by the author based on iMonitoring. URL: https://www.iminfin.ru/areas-of-analysis/budget/otdelnye-pokazateli-ispolneniya?territory=45000000 (accessed on 18.07.2023).

In terms of regional budget revenues as a recommendation it seems appropriate to draw attention to the need to improve the quality of administration of state revenues on the basis of improving the methods of budget forecasting of revenues. Indeed, the analysis of control and expert-analytical materials of the control and expert-accounting bodies of the constituent entities of the Russian Federation shows that there is often a significant under-receipt of revenues or, on the contrary, excessive growth of their volumes, which in general allows to state the inaccuracy of methods of budget forecasting of regional revenues. Closely related to this issue is the problem of introduction and assessment of tax expenditures of the regions.

Establishment of new regional powers on the subjects of joint jurisdiction provides for the need to find sources of their financial support, which (in order to improve the sustainability of regional budgets in connection with the improvement of the delimitation of powers) is recommended to be carried out on the basis of the specifics of the assumed expenditure obligations arising as a result of the consolidation of the relevant regional powers. In this regard, as such sources can be considered the expansion of the practice of providing inter-budgetary subsidies, other inter-budgetary transfers for the purpose of co-financing expenditure commitments on subjects of joint jurisdiction, which fully corresponds to the goal of establishing a unified system of public power.

In order to implement regional powers to build infrastructure, it is recommended to more actively attract and use infrastructure budget loans provided under the federal project "Infrastructure Menu".[7] In addition, since the regions have the right to exercise powers that are not assigned to the subject of jurisdiction of the Federation and the subject of joint jurisdiction, the issue of the sources of their financial support is quite important from the point of view of improving the sustainability of regional budgets. It should be taken into account that the principle of general (cumulative) coverage of budget expenditures does not provide for linking budget expenditures with its certain revenues, except for those situations when the law stipulates the implementation of budget expenditures in cases and within the limits of receipt of certain non-tax revenues of budgets.[8] In this regard, it is proposed to apply the mechanism of financial provision of certain powers by redistributing budget allocations through the consolidated budget list and without amending the budget law. At the same time, it is recommended to consider the existence of the possibility of such redistribution in cases and within the limits of receipt of the relevant non-tax revenues of the budgets of the regions as the basis for redistribution of budget allocations.

PECULIARITIES OF APPLICATION OF DEBT FINANCING INSTRUMENTS IN THE IMPLEMENTATION OF REGIONAL POWERS

Among the sources of financial support, special attention should be paid to the fundamentally new ones, which are used in the activities of both economic entities and a particular region. In particular, we are talking about the use of debt financing instruments, including "green" bonds. Their application is based on ESG principles, which provide for the implementation of sustainable development financing taking into account environmental, social, and corporate governance principles.

The principles of "green" bonds in global practice are implemented by the International Capital Market Association (ICMA). According to ICMA, these securities are debt instruments, the proceeds from the placement of which (or an equivalent amount) are used to finance or refinance, including in full or in part, new and/or existing "green" projects.[9]

The application of "green" bonds under the ICMA principles is based on four main components:

- utilisation of funds;
- project appraisal and selection process;
- management of funds;
- reporting.

The use of bond proceeds is limited and can only be used for "green" projects. The latter include those related to renewable energy, energy efficiency, pollution prevention, sustainable management of natural resources and land use, biodiversity conservation, environmentally friendly transportation, sustainable water and wastewater management, "green" buildings, and others. All of them are fully within the competence of the regions.

The process of project evaluation and selection consists of the issuer establishing and providing potential investors with information on the purpose of "green" projects, the procedure for determining their eligibility, and the identification and assessment of potential risks of such projects. Funds management involves

[7] Passport of the federal project "Infrastructure Menu". URL: https://minstroyrf.gov.ru/upload/iblock/d07/FP_Infrastrukturnoe_menyu-01.02.2022.pdf

[8] Budget Code of the Russian Federation of 31.07.1998 No. 145-FL. Art. 35. URL: https://www.consultant.ru/document/cons_doc_LAW_19702/?ysclid=lt7d1e5313919266518

[9] International Capital Market Association (official website). 2023. URL: https://www.icmagroup.org/assets/documents/Sustainable-finance/Translations/Russian-GBP_2021–06v2–100222.pdf (accessed on 19.07.2023).

keeping records of funds from the placement of "green" bonds in a separate account in a way that should be recorded in the form of a special procedure related to operations within the framework of such projects.

Upon completion of individual stages of "green" projects, the issuer generates the necessary information on the use of funds from the placement of "green" bonds.

Thus, the application of new approaches to the mobilisation of financial resources by executive government agencies of the constituent entities of the Russian Federation seems to be quite justified, as it provides for the possibility of directing the latter to the implementation of specific powers. In particular, within the framework of Federal Law No. 414-FL, the authority to organise transport services for the population has been expanded — the involvement (along with the previously listed types of transport) of urban land electric transport, which includes electric buses (clause 23, part 1, article 44).

In this regard, the experience of Moscow (as a city of federal significance) in the application of "green" bonds, the placement procedure of which is based on ICMA principles, is quite illustrative.

In order to define exhaustive requirements for government securities classified as green bonds, the Concept of Green Bonds of the City of Moscow was adopted.[10] Their placement with the right to purchase only by individuals began on 30 May 2023 on the platform "Finservices" of the Moscow Exchange; the volume of the issue was 2 billion roubles, the coupon rate — 8.5% per annum. It should be noted that the entire volume turned out to be in demand and was implemented in less than one and a half months against the planned term of six months. Funds from the placement of "green bonds" were used to purchase electric buses, which meets the objectives of an eligible "green" project, as well as the criteria for sustainable (including "green") development projects in the Russian Federation and the requirements for verification of sustainable development financing instruments in the Russian Federation.[11]

Thus, since within the limits of regional powers on subjects of joint jurisdiction there are quite a large number of powers related to environmental development, such practice of financial support for the implementation of permissible projects is one of the ways to increase the sustainability of regional budgets, contributes to solving the problems of environmental, economic and social development of the regions.

PROPOSALS TO IMPROVE THE IMPLEMENTATION OF DELEGATED POWERS AND AUTHORITY

Within the framework of analysing the delimitation of powers, special attention is also paid to the issue of powers delegated on the basis of individual federal laws. In the course of the study of federal legislation it was revealed that to date the provisions on delegation of powers have been established in 37 federal laws providing for a total of 110 powers. The most active process of delegation of powers was observed in the period up to 2015 (*Fig. 2*).

The regional level is mostly delegated with powers in the area of:

- protection and use of fauna objects, water and forest relations, veterinary — about 38 powers;
- social sphere (prevention of neglect of minors, provision of housing for certain cat-

[10] Moscow City Government Order No. 309-GO dated 23.05.2023 "On Amending the Moscow City Government Order No. 269-RP dated 23 April 2021". URL: https://www.dropbox.com/s/y8aviifuhae5cs6/3.%20Концепция%20зеленых%20облигаций%20%281%29.pdf?dl=0 (accessed on 19.07.2023).

[11] Resolution of the Government of the Russian Federation of 21.12.2021 No. 1587 "On Approval of Criteria for Sustainable (including green) Development Projects in the Russian Federation and Requirements for the Verification System of Sustainable Development Financing Instruments in the Russian Federation" URL: http://government.ru/docs/all/136742/ (accessed on 19.07.2023).

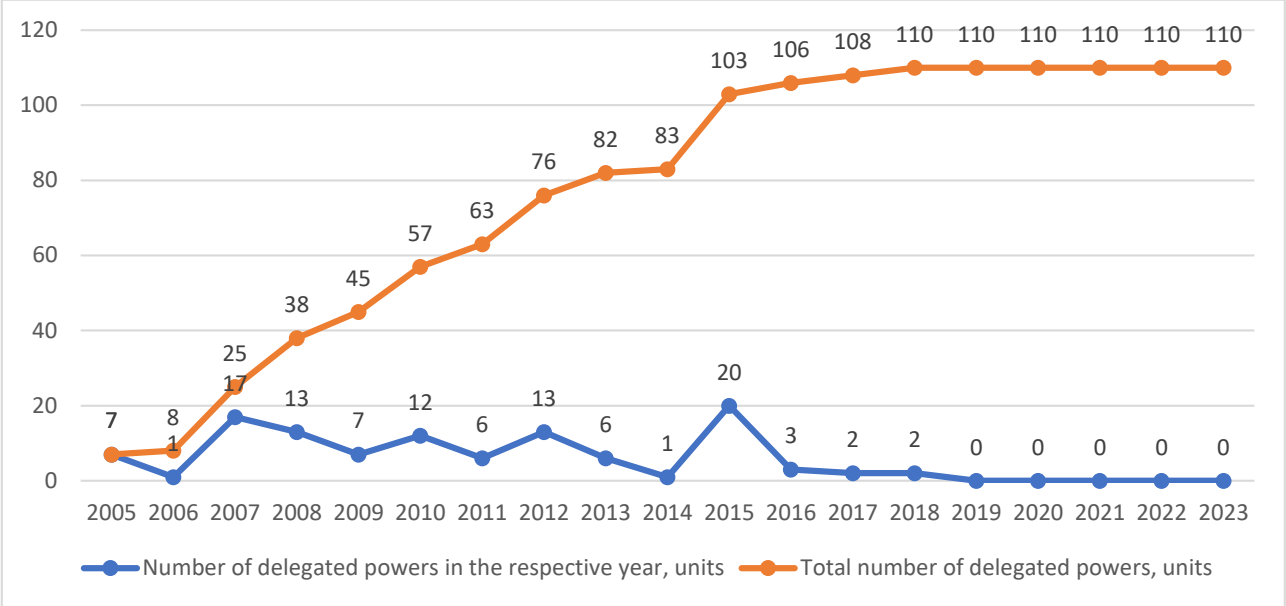

Fig. 2. **Dynamics of the number of delegated powers**

Source: compiled by the author.

egories of citizens in need, provision of social support measures for payment of housing and communal services, work and employment, education, etc.) — about 33 powers;

• management of federal land plots — 23 powers.

This list also includes certain powers in the field of accounting, reporting and statistics (4 powers), environmental expertise (3 powers), provision of judicial power (2 powers), town planning and architecture (2 powers), protection of objects of cultural heritage (2 powers), state registration of acts of civil status (1 power), military registration of citizens (1 power), and others.

Delegation of powers to regional bodies is currently carried out exclusively within the framework of powers under the subjects of jurisdiction of the Federation and subjects of joint jurisdiction, and its financial support is provided by subventions from the federal budget.

At the same time, within the framework of the principles of financial support for the exercise of regional powers provided for by Art. 42 of Federal Law No. 414-FL establishes certain cases in which a subvention may not be granted — for example, when there is no need for the following:

• creation of new regional bodies and state institutions;

• making additional budget investments, payments from regional budgets to citizens and legal entities;

• increasing the number of regional state civil servants and employees of state institutions.

Thus, the implementation of the delegated powers, unless one of the above situations is expected to occur, is carried out by the regions independently at the expense of their own budgets, but with the preservation of control by the federal executive authorities over this process.

We believe it is reasonable to note that the implementation of powers (including transferred powers), which are not assigned to the regions within the existing delimitation of powers, provides for the expansion of job responsibilities of regional civil servants, employees

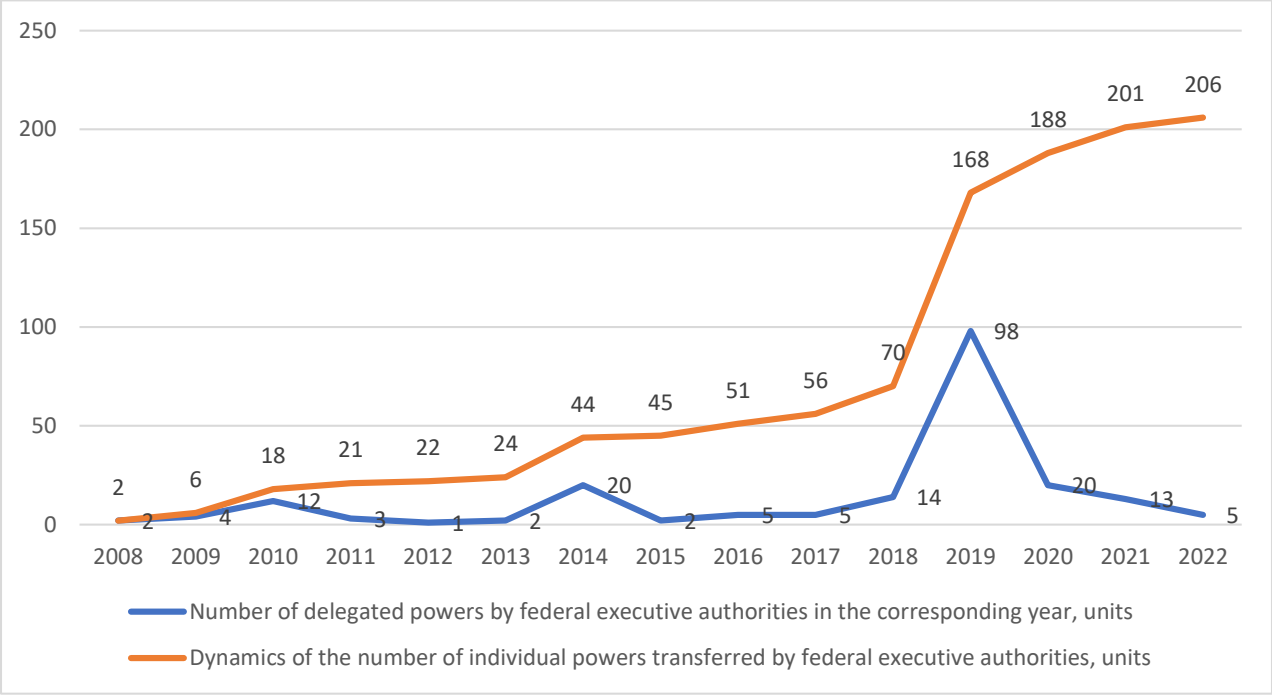

Fig. 3. **Dynamics of the number of powers transferred by federal executive bodies to regional executive bodies**

Source: compiled by the author.

of state institutions — a situation arises when the region actually performs powers not assigned to its competence, but at the expense of its own funds.

In this regard, the need to improve the methodology for calculating the volume of subventions becomes obvious. This should take into account not only the creation of bodies and institutions, investment, but also the need to financially support the performance of job duties by regional civil servants and employees of public institutions in a combined format.

The analysis of the part of powers delegated by federal executive authorities (hereinafter — FEA) to regional executive bodies (*Fig. 3*) showed that 205 concluded agreements are currently in force, and one was recognised as invalid in 2018. [14].

The main federal executive authorities that have concluded agreements with regional executive bodies on the transfer of certain powers are the Ministry of Labour of Russia, the Ministry of Health of Russia, the Ministry of Emergency Situations of Russia, the Ministry of Internal Affairs of Russia, the Ministry of Culture of Russia, the Ministry of Construction of Russia, Federal Service for Environmental, Technological and Nuclear Oversight of Russia, the Ministry of Natural Resources, Federal Agency for Subsoil Usage, Russian State Register, and others. The delegated powers include mainly such issues as the provision of social protection measures for the disabled and certain categories of citizens, provision of technical rehabilitation equipment, sanatorium and resort treatment, protection of the population and territories from emergency situations, drawing up protocols on administrative offences in the sphere of public order and security, etc.

The implementation of the mechanism of transferring a part of powers on the basis of the concluded agreement is, most likely, of an exceptional nature, since its application is possible only in the case when a part of powers cannot be

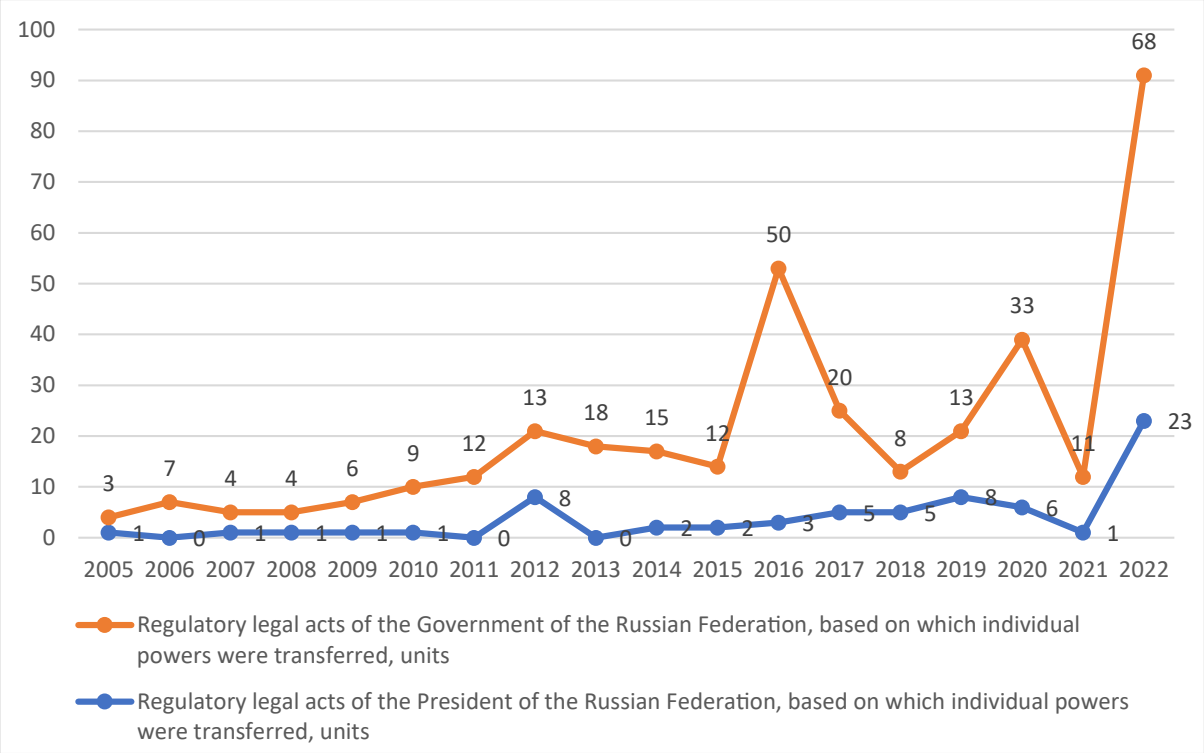

Fig. 4. **Dynamics of the number of adopted acts of the President of the Russian Federation and the Government of the Russian Federation**

Source: compiled by the author.

assigned by the federal law equally to regional executive bodies. It should be noted that this format fully takes into account the interests of both parties to the agreement, since the current legislation provides for provisions on the transfer of the necessary amount of financial support and material resources from the federal executive body to the regional executive bodies.

The analysis of the peculiarities of transferring certain powers of federal executive authorities to regional ones on the basis of regulatory legal acts (hereinafter — RLA) of the President of the Russian Federation and the Government of the Russian Federation has shown that for the period from 2005 to 2022 about 374 such regulatory legal acts have been adopted and have remained in force to date (*Fig. 4*).

It should be noted that under Art. 46 of Federal Law No. 414-FL provisions are established on the necessity to coordinate draft regulatory legal acts being developed with executive government agencies of the constituent entities of the Russian Federation.

Since some regulatory legal acts adopted before 2005 are still in force and their provisions still establish certain powers, it is obvious to recommend the necessity of their inventory and transition from the practice of subordinate establishment of powers to their legislative regulation.

In addition, Part 2 of Article 46 of Federal Law No. 414-FL provides for a provision regarding the need to determine the scope of powers of federal executive authorities that are to be transferred to the regulatory legal acts of the President of the Russian Federation or the Government of the Russian Federation. At the same time, the procedure for determining the said volume of powers to be transferred is not established, but it is only stated that its

Table 3

Information on the number of regions distributed taking into account compliance with the conditions for the provision of extrabudgetary transfers from the federal budget

No p.p.	Indicator name	2020	2021	2022
1	Number of regions that do not receive subsidies	13	13	23
2	Number of regions in which the share of subsidies did not exceed 10 per cent of own revenues of consolidated regional budgets	32	36	19
3	Number of regions in which the share of subsidies exceeded 10 per cent of own revenues of consolidated regional budgets	34	30	37
4	Number of regions in which the share of subsidies did not exceed 40 per cent of own revenues of consolidated regional budgets	6	6	6

Source: compiled by the author.

formation takes into account federal powers both on subjects of jurisdiction of the Federation and on subjects of joint jurisdiction. In order to eliminate legal uncertainty, it seems expedient to establish the procedure for determining the volume of delegated powers.

RECOMMENDATIONS ON THE ELIMINATION OF ADMINISTRATIVE BARRIERS IN THE SPHERE OF NON-DISTRIBUTED POWERS

Particular attention should also be paid to the issue of participation of regional authorities in the exercise of powers not assigned to them under the subjects of jurisdiction of the Federation and subjects of joint jurisdiction. Current federal legislation provides for the right of the regions to participate in the exercise of such powers at the expense of their own budgetary resources, including the implementation of additional measures of social support and assistance to certain categories of citizens. This practice of involving the regions in solving tasks and fulfilling the functions of the state is a right, not an obligation, which they can use if they have an additional opportunity to do so.

At the same time, the budget legislation of the Russian Federation provides the conditions for the provision of inter-budget transfers (hereinafter — IBT) from the federal budget to the regional budgets [15]. According to paragraph 3 of Art. 130 of the Budget Code of the Russian Federation (hereinafter — BC RF), the regions, which for two out of three reporting fiscal years the share of subsidies from the federal budget exceeded 10% of own revenues of the consolidated regional budget, starting from the next fiscal year, do not have the right to establish and fulfil expenditure commitments that are not related to the solution of issues attributed by the Constitution of the Russian Federation and federal laws to the powers of executive government agencies of the constituent entities of the Russian Federation.[12]

Analysis of the data in *Table 3* shows that there are about 40 such regions, and the possibility of exercising powers that are not attributed to their competence is limited for them.

[12] Budget Code of the Russian Federation of 31.07.1998 No. 145-FL. Art. 130. URL: https://www.consultant.ru/document/cons_doc_LAW_19702/

The problem arising in this situation is that the powers not attributed to the regions represent the residual competence, which is essentially a regional competence within the framework of the domestic model of delimitation of powers, because in the case of an issue not regulated by federal legislation, its solution could be dealt with by the regions in accordance with the law of a constituent entity of the Russian Federation. Provided it is settled at the federal level, the regions will be obliged to bring their laws in line with the newly adopted federal laws. In these circumstances, a contradiction arises, since Federal Law No. 414-FL does not provide for any conditions or reservations regarding the realisation of the granted right to exercise non-transferred powers. There are also no norms of a referential nature regarding the need to implement this right in view of the Budget Code of the Russian Federation.

Thus, in the context of improving the delimitation of powers, it is important to harmonise legislative norms not by establishing prohibitions, but by giving the regions the right to independently decide on additional expansion of their powers.

In view of the above, a partial, rather than complete, ban on the exercise of powers that do not fall within their competence should be envisaged in respect of regions whose budgets for two of the three reporting fiscal years contain a share of subsidies in the volume of own revenues of the consolidated regional budget exceeding 10 per cent. Among the exceptions it is proposed to include powers in the social sphere, including the provision of additional measures of social support and protection of certain categories of citizens, based on the need criteria established by the region. The proposed recommendation fully promotes the realisation of the regions' rights to exercise non-transferred powers and harmonises the provisions of Article 130 of the Budget Code of the Russian Federation and Article 48 of Federal Law No. 414-FL.

CONCLUSIONS

The analysis of the updated legislative regulation in the area of delimitation of powers of public authorities, including on subjects of joint jurisdiction, has allowed us to establish that, in general, its improvement, provided for by Federal Law No. 414-FL, is aimed at bringing it in line with the Constitution of the Russian Federation in terms of establishing the basis for the organisation and functioning of public authorities in the constituent entities of the Russian Federation. At the same time, the updated delimitation of powers does not resolve the range of problems that have accumulated over the period of Federal Act No. 184-FL's operation. The process of establishing the correlation between the subject of regulation of Federal Law No. 414-FL and sectoral federal laws establishing the powers of regional authorities is still not regulated, which is manifested in the consolidation of identical powers in these legislative acts. To date, there has been no inventory of previously adopted bylaws that established additional regional powers in different years. The principles of financial support for the implementation of regional powers, including those in the subjects of joint jurisdiction, do not provide for conceptually new mechanisms aimed at increasing the sustainability of regional budgets.

Based on the identified problem areas, the following recommendations have been formed, aimed at establishing a balance in the legislative regulation of regional powers both on the part of Federal Law No. 414-FL and sectoral federal laws:

- regarding the need to adjust the mechanism of granting subventions (when deciding on its granting) in terms of financial provision of the transferred powers. This takes into account not only the need to create new government bodies and public institutions in the re-

gion, but also the need to financially ensure the fulfilment of the transferred powers as a result of an increase in the functions of existing regional government bodies, regional public institutions and, accordingly, an increase in the job responsibilities of regional public civil servants and employees of institutions;

- on the issue of priority implementation of legislative regulation of regional powers as compared to the current practice of adopting subordinate legislative acts, as well as the need for an inventory of previously adopted subordinate normative legal acts in order to optimise the powers provided for in them. For this purpose, it is proposed to review the enshrined regional powers for the relevance of their preservation and subsequent legislative regulation;
- regarding the expediency of harmonising the budget legislation of the Russian Federation and Federal Law No. 414-FL in terms of the regions' right to exercise non-transferred powers, which is currently possible if the threshold value of inter-budget transfers from the federal budget is not exceeded. This recommendation implies an increase in the sustainability of regional budgets under the existing delimitation of powers. The elimination of contradictions in the provisions of the above-mentioned legislative acts will fully facilitate the realisation by the regions of their residual competence, for example, in the exercise of non-transferred powers in the social sphere by providing additional social support to certain categories of citizens;
- on the issue of improving the principles of financial provision of regional powers, including through the implementation of a mechanism for raising funds through the placement of government securities according to the principle of "green" bonds, as well as the application [taking into account the principle of total (cumulative) coverage of budget expenditures] of the practice of establishing grounds for redistributing budget allocations for the implementation of certain regional powers (through the consolidated budget list without amending the law on the regional budget) in case and within the limits of receipt of certain non-tax revenues.

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ORIGINAL PAPER

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Global Experience in the Use of Unmanned Aviation Technologies in Public Administration: a Review

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ABSTRACT

TUnmanned Aerial Systems (UAS), despite their relative novelty, are already an integral component of the general aviation structure, and, based on a number of complex and sophisticated solutions, including those related to artificial intelligence, are part of the spectrum of high technologies. UAS find application not only in the sphere of commerce, but also in the realisation of specific tasks of public administration, such as territory management, healthcare, emergency prevention and elimination, ensuring environmental safety and law and order, nature management. The purpose of the study, the results of which are presented in this publication, is to assess the current state and potential of the use of UAS in these areas based on a review of literature sources on the practice of their application in order to solve the tasks of public administration in different countries of the world. The main conclusion drawn from the analysis and characterising the general scientific novelty of the study is that, despite a significant number of specific examples, the breadth of UAS use range can be characterised as imaginary. The main and the only really significant application is various types of aerial survey in the interests of state control and supervision bodies. In the course of the work, a number of promising directions for the use of UAS have been identified. It is also noted that their wider implementation in the practice of public administration is hindered by the lack and/or imperfection of the relevant legal framework, typical for most legislative systems of the world, and postulates the need to actively address these issues in relation to the classification and certification of UAS, requirements for their operators and software, the procedure and rules of operation, the integration of unmanned aircraft (UAS) into the existing air traffic management system.

Keywords: unmanned aerial vehicles; UAVs; unmanned aerial systems; UAS; unmanned aircrafts; state administration; public administration

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INTRODUCTION

The current geopolitical and socio-economic environment is characterised by increasing systemic risks due to both crisis processes affecting the fundamental principles of socio-economic development, including models of sustainable development and globalisation, and local challenges, including the recent coronavirus pandemic or the current political situation in Europe. In such a context, the role of the state as a central regulator is increasing and the corresponding social expectations are formed, actualising the issues of improving public planning and management systems. The key direction of such improvement, in accordance with modern trends of social and economic development, is the integration of digital technologies (DT) into the public administration system. The latter naturally attract the attention of researchers, as evidenced by the impressive number of publications on this topic in both domestic and foreign periodicals. At the same time, some aspects of the application of digital and other "high" technologies in the implementation of the tasks and functions of public authorities have received, in comparison with others, much less coverage in the scientific literature. Such neglected issues may include the unmanned aerial systems.

The author's contribution to the development of the above-mentioned issues is his research into the current state, prospects, practice, and potential of unmanned aerial systems application in order to solve public administration tasks in different countries of the world. In the course of the work, the author analysed the place of digital technologies in the toolkit of public administration and considered the directions of specific application of unmanned aerial systems to perform certain functions of the latter. The methodological basis of the study was formed by modern general scientific research methods: dialectical method of cognition, target, and systemic approaches to the investigated set of problems, methods of comparative analysis, detailing and generalisation.

GOVTECH: DIGITAL TECHNOLOGIES IN SOLVING PUBLIC ADMINISTRATION TASKS

The expansion of digital technologies into various branches of human activity is uneven: the pioneers in this area are the financial and telecommunications spheres, while digital technologies are penetrating significantly into medicine and education. In this regard, terms such as "fintech", "biotech", "EdTech", etc., have become common, indicating the use of digital technologies in the relevant industries. Recently, the level of integration of digital technologies into various spheres of public administration (along with an assessment of the prospects for further development of a particular area) has led to the emergence of the concept of "government technologies" or "GovTech", considered as a platform of the "electronic state" ("smart state") and implying, first of all, the realisation of the potential of digital technologies for the development of communication and coordination mechanisms between the state, citizens and business [1], i.e., as a technology for the provision of state services.

However, the concept of "GovTech" is much broader than just the provision of public services in electronic form and covers a wide range of technologies that allow improving and optimising public administration processes. These include solutions in the field of paperless document management, technologies of "smart cities" and "digital regions" [2], monitoring and decision-making systems, electronic services in the transport, environmental and energy spheres, as well as in the field of public safety, etc. All these techni-

cal innovations are actively implemented in the world practice of public administration, which actualises the issues of accumulating and analysing the gained experience to determine the prospects and needs for further development of high technologies.

The experience of automation and digitalisation of public service delivery and document flow has been studied most fully [3]. There is a significant number of both individual publications in scientific periodicals and consolidated reports of international organisations — for example, the World Bank and the EU Joint Research Centre [4–6]. The completeness of the information published in them seems to be quite exhaustive, which is due to a rather long period of time that has passed since the beginning of the intensive introduction of digital technologies in the sphere of public service delivery.

Researchers' attention is naturally drawn to the application of artificial intelligence (AI) technologies in the processes of state planning and management, the development of which is characterised by an "explosive" nature in recent years. A number of researchers [7, 8], positively assessing the available experience of their application both for the purpose of proactive provision of some public services in specific life situations of citizens and in the sphere of assistance to civil servants in solving administrative tasks, advocate their active introduction into the practice of public administration and subsequent step-by-step solution of problematic issues arising in connection with the planning, development and deployment of AI systems. Other scientists, while paying tribute to the opportunities, prospects and advantages of AI technologies, are nevertheless inclined to caution the state and business about such potential consequences of their too hasty implementation as the displacement of many specialities in the corporate sector and in the civil service, which may lead to increased unemployment and social tension — according to the authors [9, 10], the issues concerning the limits of AI-technologies implementation at the current stage of socio-economic development and the degrees of freedom of artificial intelligence require a thorough public discussion involving the widest range of participants.

M. Ryan, recognising the solutions developed on the basis of AI in public administration as effective and diverse, emphasises the ethical side of the problem and the need for a high degree of openness and control over AI to ensure a proper level of legal responsibility for decisions made with its help [11]. T. Walsh and S. Mikhailov et al., analysing the prospects for the wide implementation of AI in public administration, compare it to a new stage of the industrial revolution, during which the key factor of scientific and technological leadership will be data, as well as algorithms and power of their processing [12, 13]. According to these scientists, AI will ensure the development and transformation of public policy under conditions of high uncertainty characteristic of the modern world, affecting all its spheres — from the provision of public services to the strategy of economic development.

As can be seen, the role of some governmental technologies has been studied quite well due to their widespread use; others have received increased attention due to the prospects offered by their extensive implementation, although their actual practical use is currently not so significant. At the same time, some digital technologies that have already been successfully implemented in the sphere of public administration do not arouse so much interest.

The latter include unmanned aircraft and unmanned aerial systems based on them, which, despite their comparative novelty, are in fact an integral component of the overall

aviation structure and undoubtedly part of the high-tech spectrum, based on a number of sophisticated solutions, including those related to AI. Unmanned aerial systems find a number of applications not only in the sphere of commerce, but also in the implementation of specific tasks of public administration. At the same time, such experience of their use remains practically ungeneralised and, even more so, unanalysed, and the majority of publications linking unmanned aerial systems and public administration are devoted to the issues of state regulation of this sphere.

APPLICATION OF UNMANNED AERIAL SYSTEMS TO SPECIFIC GOVERNMENT FUNCTIONS

At present, unmanned aerial systems are mainly used in the implementation of specific links in the functional chain of state monitoring, supervision, and control in various industries. The most widespread use of unmanned aerial systems today is in the sphere of prevention, detection, and elimination of emergency situations (ES).

Compared to manned aerial vehicles, unmanned aerial vehicles, as the world experience of their application in the sphere of monitoring, prevention and elimination of emergencies shows, are characterised by a number of advantages [14, 15]:

- high cost-effectiveness [unmanned aerial vehicles (UAVs) tend to be significantly cheaper than manned aircraft, both on their own and in operation];
- low-altitude (ability to perform tasks such as aerial photography or sampling at altitudes of 1 metre or above);
- pinpointing (the ability to obtain information on relatively small or hard-to-reach objects);
- mobility (unmanned aerial vehicles do not require specially equipped take-off sites and aerodromes, and the whole complex of unmanned aerial systems can be very compact and can be moved with the help of a passenger car, and in some cases manually);
- rapidity (the cycle of unmanned aerial vehicle application from travelling to the monitoring area to obtaining its results takes considerably less time than with the use of manned vehicles or satellite imagery and photography);
- environmental friendliness (unmanned aerial vehicles use low-power internal combustion engines or electric motors);
- no danger to the operator of the unmanned aerial vehicle, who controls it remotely.

The effectiveness of the application of unmanned aerial systems in this area is confirmed by significant accumulated practical experience.

One of the first cases of mass application of unmanned aerial systems for emergency response appears to be the 2014 flooding in the Balkans, when the displacement of large masses of soil together with minefields preserved from the war was recorded, with some mines being moved up to 20 kilometres away. Aerial photography from unmanned aerial vehicles provided images that were used to create a 3D map and geostatic modelling to determine the directions and distances of mine movement [16].

The area of emergency monitoring where unmanned aerial systems show significant effectiveness is the prevention and detection of natural fires. It is known that the effectiveness of firefighting depends directly on the speed of detecting fire centres, but it is very difficult to spot them in areas remote from human habitation. In this case, traditional monitoring methods are either very costly (aerial patrols by manned aircraft) or too slow (satellite imagery or ground patrols). The

experience of using unmanned aerial systems to detect wildfires in South Africa has shown that the average time to detect a fire, compared to ground patrols, has been reduced from several hours to tens of minutes at a much lower cost [17, 18]. Today, the use of unmanned aerial systems for these purposes is widespread in other countries of the world, including the USA and Canada [19], Australia, China, and Brazil [17], and in some regions of Russia [20]. In addition to monitoring the fire situation, drones can also be useful for extinguishing small fire areas [21].

An international team of researchers has developed a volcanic eruption prediction system based on a serial DJI Phantom quadrocopter retrofitted with spectrometers and gas sensors that determine the content of sulphur and carbon dioxide in the air near the volcano and directly in its vent. Analyses of the obtained data make it possible to predict with high accuracy the time of the next eruption [22]. For similar purposes NASA specialists have created and started using a complex based on a modified military unmanned aerial vehicle RQ-14 Dragon Eye [23]. Unmanned aerial systems are also used to collect other geophysical information, such as magnetometric data, in particular, for earthquake forecasting [24].

Hurricanes and tropical storms are another potential source of emergencies that require careful study and constant monitoring. This problem is most acute in the USA, and therefore it is there that NASA, NOAA and Northrop Grumman Corporation jointly developed and implemented a system of meteorological data collection and observation of hurricane development based on heavy unmanned aerial vehicles. This made it possible to significantly accelerate the detection of potentially dangerous atmospheric vortices compared to traditional methods of observation from manned aircraft and satellites [25].

An interesting example demonstrating the wide range of possible applications of unmanned aerial systems for monitoring and disaster prevention is their use to detect sharks near beaches in Australia and the USA. A joint project between Duke University and North Carolina State University in Chapel Hill (USA) has developed a fully automated drone-based system for the detection of dangerous hammerhead sharks.

A related area of application of unmanned aerial systems in the public sector in relation to emergency monitoring is environmental monitoring carried out within the framework of the relevant branches of state control (supervision). As a rule, in this area unmanned aerial vehicles and systems based on them are used to solve some specific tasks.

For example, since 2014, Mexican authorities have been using unmanned aerial systems to monitor beaches that are breeding grounds for sea turtles and to combat poachers. In Kenya, unmanned aerial systems patrolling nature reserves and national parks are also used to detect and prevent poaching, which has significantly (up to 96%) reduced the number of such crimes [26]. In the People's Republic of China, unmanned aerial systems are regularly used to monitor air pollution over industrial enterprises, power plants, and other potential sources of harmful emissions [27]; unmanned aerial vehicles are occasionally used for similar tasks in other countries (USA, Italy, France). In Denmark, unmanned aerial systems are used to monitor sulphur and other undesirable substances in the exhaust gases of ships travelling through the Great Belt Strait, which makes it possible to significantly reduce the time required for their passage through the strait, since the analysis is carried out without stopping the ships and having the measuring team board

them.[1] Unmanned aerial systems are used in India, Brazil, and a number of other countries, including Russia, to monitor forests, including detection of illegal logging sites [19].

Unmanned aerial vehicles are used in polar ice melt monitoring, where they provide more accurate data than satellites, as well as in assessing plastic pollution of the world's oceans, monitoring rare and endangered species of animals and other tasks related to the collection and analysis of data on the state of the environment, which are then used in making administrative decisions.

It is possible to note a number of other areas tested in practice, where unmanned aerial systems can be involved in solving the tasks of public administration: land monitoring, including assessment of the state of land resources, detection of illegally occupied and misused land plots, cadastral surveying of land [28]; monitoring of water bodies [29]; inspection of linear infrastructure facilities [30]; ensuring road safety [31], and others. However, the scope and objectives of this study do not allow us to consider each of them in detail.

CONCLUSIONS

In the course of the study, it was established that despite a significant number of specific applications of unmanned aerial systems in solving public administration tasks, the range of their use cannot be called wide. The main and, to date, the only really significant area of operation of unmanned aerial systems is various types of aerial surveys in the interests of state control and supervision bodies. In this regard, the possibilities of using unmanned systems in public administration seem far from being exhausted — on the contrary, the potential of drones is only beginning to be implemented. Based on the analysis of scientific and industry publications, it is possible to identify a number of promising areas of application of unmanned aerial systems for solving tasks and fulfilling functions of state administration:

1) cargo delivery (air logistics). It can be implemented wherever it is less expedient to solve transport tasks by traditional methods due to time and financial constraints. In the short term, the most relevant is the introduction of unmanned aerial systems in the implementation of health care and emergency response tasks (delivery of medical supplies, rescue packs, food, fuel, clothing, etc.). However, in the future, provided that unmanned technologies become more widespread and cheaper, unmanned aerial systems may be used, for example, in regular supply of remote settlements and special institutions (meteorological and polar stations, stationary forest guard posts, etc.), and later — in solving other transport tasks as well;

2) human transportation. It is often combined with the previous type of use of unmanned aerial systems into a general (logistic) direction, but due to the increased requirements in this case both to the unmanned aerial vehicles themselves and to the air traffic organisation, it seems reasonable to consider it separately. While cargo delivery is a fully operational (even if in experimental mode) technology, the transport of people using unmanned aerial vehicles is currently considered only as a potential use. Nevertheless, as in the previous case, the most likely development of this area is in the field of emergency medical care and disaster medicine, and only afterwards — in other areas of activity;

3) monitoring. As mentioned above, it is currently the main regular use of unmanned

[1] Danish Authorities Use Drones to Monitor Sulfur Emissions of Ships. The Maritime Executive. 2020. URL: https://www.maritime-executive.com/article/danes-use-drones-to-monitor-sulfur-emissions-of-ships. (accessed on 20.02.2023).

aerial systems in solving public administration tasks. At the same time, this direction is also characterised by the greatest potential for further development. In the near future, we can expect a wide introduction of unmanned technologies in the field of monitoring of fires and other emergency situations, as well as transport situation, inspection of linear objects (railway and energy infrastructure, gas and oil pipelines), etc., including aerial reconnaissance and protection of territories and objects;

4) distribution of substances, including firefighting, aerial chemical operations in agriculture and forestry, application of reagents for oil spill response and soil binding, etc.;

5) communication support. It implies the use of unmanned aerial vehicles as satellite and radio signal repeaters when deployment of fixed and land mobile communication systems is impossible or inexpedient — in emergency situations, in places of short-term stay of the users, in case of temporary increase of load on communication systems, etc.;

6) educational, sports and cultural and entertainment applications of unmanned aerial systems include their use for developing engineering and technical competences of schoolchildren and students, organising relevant sports competitions ("drone racing", sports navigation) and for creating visual effects (at entertainment events, in advertising, etc.);

7) physical interaction with objects. It potentially includes a wide range of applications of unmanned aerial systems in various fields of human activity — construction (high-altitude installation works), housing and communal services (sawing trees, cleaning windows and facades of buildings), emergency prevention and response (warning, rescue works), science and environmental protection (sampling), etc. The use of unmanned aerial systems in this area is also very promising. This area is, along with human transportation, the least developed and, at the same time, very promising one.

Progress and widespread adoption of unmanned aerial systems is hampered primarily by the fact that they are based on a number of complex technologies, many of which are still under development. Until significant progress is made in some areas, many of the most innovative applications of unmanned aerial systems will remain at the conceptual or experimental stage. These technologies include, but are not limited to: autonomous flight, battery performance, collision detection and avoidance, and integrated air traffic management systems — Unmanned traffic management (UTM).

In many respects, the lack or imperfection of a legal and regulatory framework also hinders the wider implementation of unmanned aerial systems in the practice of public administration. This problem is characteristic of legislative systems in most countries. In developed countries, the tasks of developing adequate regulatory support in the field of classification and certification of unmanned aerial systems, requirements for their operators and software products, defining the procedure and rules of operation, integration of unmanned aerial vehicles into the existing air traffic management system are being actively addressed.

Our country has also adopted a number of relevant regulatory documents, but Russian legislation in this area is invariably assessed by experts as "imperfect". However, on 30 December 2022 the President of Russia V.V. Putin approved the List of instructions on the development of unmanned aircraft systems,[2] according to which the solution of the tasks of

[2] List of instructions on the development of unmanned aerial systems. URL: http://kremlin.ru/acts/assignments/orders/70312 (accessed on 20.01.2024).

elaboration and implementation of the state policy in this area has been intensified to a great extent. It is expected that this will contribute to a wider integration of unmanned aerial systems into various fields of activity, including the sphere of public administration.

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Economic Methods of Managing the Environmental Safety of Cities Abroad: Tax Aspect

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ABSTRACT

The purpose of the study is to analyze and generalize the economic methods used abroad for managing the environmental safety of a city and to assess the possibility of their use in the practice of Russian cities. The relevance of the work is conditioned by the fact that a significant part of large Russian cities and megalopolises are faced with serious problems in the environmental sphere. Abroad, many years of experience have been accumulated in solving similar issues through the use of methods for managing the environmental safety of the city, which is an argument in favor of its study. The article analyzes the practice of OECD countries in applying economic measures to reduce environmental pollution, ensure environmental balance and comfortable living conditions for the city population. Particular attention is paid to the powers of local governments in the environmental sphere and the degree of their financial autonomy; the benefits of environmental taxation in EU countries, including the transition to a low-carbon economy; organization of ecological cooperation on the principles of the circular economy and within the framework of the model of industrial symbiosis for the processing or use of industrial and household waste. In the course of the work, general scientific and special methods were used, including content analysis of literary sources, comparison, grouping, analogy, systemic and structural analysis, logical generalization. The results of the study consist in assessing the possibilities and determining the conditions for introducing the best foreign practices in environmental safety management in Russian cities; they can be useful to specialists dealing with both the problems of forming management decisions to stabilize the environmental situation in the city, greening the tax system at the local level, and ensuring the rational use of resources in a mobilization economy through cooperative relations in the processing of industrial and household waste through recycling.

Keywords: management; environmental safety; city; powers of local self-government bodies; environmental taxation; environmental cooperation

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INTRODUCTION

Nowadays, environmental safety is an important task of city management, as it is one of the key parameters for assessing the quality of life of the population. Urbanisation, high technogenic and anthropogenic load on the environment require the city management to take measures of administrative, economic, and organisational nature aimed at reducing air, water pollution and soil contamination, which arise as a result of the activities of industrial facilities located in the city limits, as well as dense traffic and, accordingly, a large amount of exhaust gases, industrial waste dumps and household waste disposal. Economic methods of environmentally safe development of the city include the establishment of tax rates, fees, fines, subsidies; regulation of the activities of economic entities, compliance with the principles of distribution of responsibility for environmental damage; taking into account the interests of participants in environmental projects.

The use of such methods makes it possible to incentivise environmental protection, compensate for damage from air, water pollution and soil contamination, fulfil the tasks of collecting payments for the use of natural resources and compensation for environmental damage, and promote motivation to expand environmental protection measures.

The above is discussed in the works of N.P. Ketova, O.I. Lyakhovenko and D.I. Chulkov, P.O. Mosorova and Yu.V. Yoda, Yu.I. Pyzheva and E.V. Zander, K.N. Khazov [1–5]. According to scientists, the authorities of the largest Russian cities do not widely apply such economic tools as ensuring the correlation between the powers of local governments in the environmental sphere and their financial capabilities; targeted attraction and use of local budgets for the implementation of environmental protection measures; application of direct and indirect incentives for the organisation of industrial and household waste recycling (with the participation of urban enterprises) to solve the problems of sustainable development of the territory and rational use of resources for environmental protection, which is an important factor in the mobilisation model of the economy.

METHODOLOGICAL APPROACH TO ANALYSING THE PROBLEM

The complexity of the environmental situation is emphasised by the data of experts from KB "Strelka" [6], which indicate that in 2022 in 1/3 of the 173 largest cities of Russia there is an increased, and in 1/10 of them — a high level of the integral index of atmospheric pollution by such substances as carbon monoxide, formaldehyde, nitrogen dioxide, sulphur dioxide and aerosols [6]. Maximum indicators are observed in megacities and one twentieth of industrial cities. To stabilise the environmental situation in these settlements, specialised programmes and projects are developed and implemented at the federal, regional, and local levels. In particular, the national project "Ecology" consists of a set of measures in ten main areas of environmental protection and environmental activities.[1] The projects "Clean Air". "Clean Country" and "Formation of an Integrated System of Solid Municipal Waste Management" are focused on the reduction of pollutant emissions into the atmosphere through the transition to environmentally friendly public transport, modernisation of the heat and power industry, greening of the territory, elimination of landfills and growth of household and industrial waste recycling. Financing of such initiatives is mainly carried out at the expense of the federal budget or, as Yu.I. Pyzheva and E.V. Zander note, "at the expense of the enterprises' own sources" and "practically no financing from

[1] National Project "Ecology". Ministry of Natural Resources and Environment of the Russian Federation (official website). URL: https://www.mnr.gov.ru/activity/np_ecology/?ysclid=lsxensdcpm455607446

local budgets is envisaged" [4]. At the same time, O. I. Lyakhovenko and D. I. Chulkov draw attention to the fact that "the main problem of Russian cities is that they cannot solve their problems themselves. As a rule, they have deficit budgets, and most of their expenditures are social. In such a situation, there are not enough finances for environmental expenditures" [2]. The main source of revenues of local budgets is tax revenues. However, S. M. Mironova [7] emphasises that the funds coming to the budget from environmental taxes and fees do not correspond to the amount of environmental expenditures. E. Kirova and A. Bezverkhiy, G. N. Semyonova, D. A. Smirnov and A. A. Zavorikin, S. I. Chuzhmarova and A. I. Chuzhmarov agree with her [8–11]. They refer to the experience of environmental taxation in OECD and EU countries and propose the development of an environmental tax policy that motivates careful environmental management and the introduction of innovative technologies [8], as well as justify the need to comply with the principles of "polluter pays" to "provide incentives for investment in innovative eco-technologies for the protection of the natural environment" [9]; identify the advantages of using tax instruments to regulate activities in the environmental sphere and the need to humanise the tax system in the environmental aspect [10]; argue in favour of the expediency of combining "tax incentives for investment in green technologies and tax disincentives for environmental pollution" [11].

As mentioned above, an important task both in the development of environmental policy of a smart city [1] and in the formation by local governments of a favourable environmental situation as the most important indicator of the quality of life of the population [3, 5] is the processing of industrial and household waste on the principles of recycling, as well as through the organization of industrial symbiosis, which, in turn, will promote the rational use of local resources. B. G. Preobrazhensky, T. O. Tolstykh and N. V. Shmeleva [12], Yu. V. Nikulichev [13], E. E. Utkina [14] adhere to this viewpoint.

Based on the presented scientific works and our own research, we will analyse the three mentioned aspects of the use of economic methods of urban environmental safety management in OECD countries and substantiate the possibilities of their application in the Russian practice.

As an information base, we use a sample of countries with the cleanest cities in the world, according to the results of the rating compiled in 2021 by Yale University for the World Environment Forum (hereinafter — Rating 2021),[2] which is due to the methodological approach proposed in the work "Local self-government autonomy in comfortable cities of the world" [15]. Its authors confirm the hypothesis about the influence of local government powers in various spheres of city life (including the environment) on ensuring comfortable living conditions for the population.

This methodological approach is based on the assessment of the correlation between the powers of local self-government bodies (LSG) and their organisational and financial autonomy, as well as independence in the formation and distribution of city budget funds, setting local taxes and tariffs for public services [15]. Let us use this approach to analyse the powers in the environmental sphere, as well as the financial autonomy of local governments in the most environmentally friendly cities in the world, which, according to the Rating 2021, were determined by the following parameters: environmental condition, ecosystem vitality, biodiversity, air, and water pollution. The top 30 include 17 cities from Europe, six from North America, two each from Asia and New Zealand, and one each from Australia, Africa, and South America. This

[2] World Ecological Forum. 2021. URL: https://worldecologicalforum.com//

ranking is confirmed by Mercer agency,[3] analytical company IQAir,[4] Global Gridded Model of Carbon Footprints project.[5]

All these cities are guided by Goal 11 of the UN Resolution: "Ensure transparent, inclusive, safe, resilient and environmentally sustainable cities",[6] as reaffirmed in the Urban Agenda adopted at the October 2016 United Nations Conference on Housing and Sustainable Urban Development (Habitat III). According to this document, the smart city concept "harnesses the power of digitalisation, clean energy and clean technology, and innovative transport technologies, thereby empowering residents to make more environmentally friendly choices and stimulate sustainable economic growth, as well as enabling cities to improve service delivery".[7]

Each city implements a sustainable development strategy, in which a significant place is given to environmental safety management through administrative and economic methods. Application of ecological and economic approaches affects budget and extra-budgetary fund revenues, stimulates enterprises to reduce destructive impact on the environment and improve the rational use of natural resources, energy and resource saving through alternative energy sources and expansion of opportunities for processing industrial and household waste. An important condition in this case are the principles of management of the city environmental safety system, including the distribution of powers of public administration and local self-government bodies; priority; stage, motivation; risk consideration; informativeness; publicity and transparency, public engagement.

Let us dwell more on the powers of local self-government bodies (LSG) in the environmental sphere. Local self-government bodies in the countries where ecologically clean cities are located are vested with them to a greater or lesser extent. The differences lie in the fact that some states, in addition to environmental protection, include fire protection (Great Britain, Spain), waste collection and disposal (Great Britain, Denmark, Spain, Netherlands, Sweden). At the same time, the financial capacity (the degree of financial autonomy and the level of tax independence) to implement these powers also varies (*Table 1*).

ENVIRONMENT AND FINANCE

According to the authors [15], there are the following degrees of financial autonomy: *high*, which implies fiscal autonomy of local self-government bodies; *medium*, in which local self-government bodies play the leading role in financing social payments; *relative*, which implies autonomy of budgets of different levels and their interaction; *low*, characterised by centralised distribution of funds. In turn, M.V. Gracheva defines tax independence of local self-government bodies in the following way [16]: *broad*, i.e., local self-government bodies are free to establish tax rates and tax benefits; *moderately broad* — local self-government bodies are free to establish tax rates or tax benefits; *moderately narrow* — local self-government bodies participate in tax distribution schemes between the state and local self-government bodies both in terms of proportions and terms; *narrow* — tax rates and benefits are established by the state.

Let us consider the experience of implementation of environmental and financial powers of local self-government bodies in some EU countries, where ecologically clean cities

[3] Quality of Living. City Ranking. 202.3 URL: https://www.mercer.com/insights/total-rewards/talent-mobility-insights/quality-of-living-city-ranking/

[4] AQ Air. URL: https://www.iqair.com/ru/world-air-quality-ranking

[5] Global Gridded Model of Carbon Footprints. URL: https://www.citycarbonfootprints.info/

[6] The transforming our world: 2030 Agenda for Sustainable Development. 2015. URL: https://sustainabledevelopment.un.org/post2015/transformingourworld

[7] The New Urban Agenda. United Nations. 2017. URL: http://habitat3.org/wp-content/uploads/NUA-English.pdf

are located. For example, in Denmark local self-government bodies within the framework of environmental protection — plan the placement of water treatment facilities, water supply systems, collection and utilisation of domestic and industrial waste, regardless of the level of their danger. Expenditures on environmental protection account for approximately 4 per cent of the consolidated budget, nine tenths of which are covered by local budgets; the latter are formed mainly from environmental taxes and payments by nature users [17, 18].

In Norway, municipalities play an important role in the implementation of environmental policy. The subject of bills on environmental safety are directly the sources of emissions of harmful substances; the volume of the latter is regulated on the basis of obtaining an emission permit [19]. In France, local self-government bodies are vested with environmental powers not only in terms of environmental protection, but also in the maintenance of water bodies and coastal territories, collection of household waste, sanitary control, landscaping, water supply and drainage — these powers are financed by appropriate taxes and fees [17, 18]. Environmental taxation at the local level in the USA is aimed at solving the tasks of environmental protection from harmful industrial production. For example, additional excise taxes on oil are introduced to finance a special fund programme to clean up hazardous waste, which is also funded by a percentage of the Alternative Minimum Tax (AMT) [9, 19]. As M.A. Urazgalieva notes, "in order to mobilise funds for cleaning groundwater from harmful contaminants coming from oil storage in underground storages that threaten the purity of drinking water, a tax on petrol, diesel fuel and special motor fuel has been introduced. New York has a tax on cleaning up oil slicks on bodies of water." [19]. In some U.S. states and Canadian provinces there is a so-called "carbon tax — "a tax on carbon, methane, greenhouse gas emissions that is levied on the carbon content of fossil fuels"" [11]. In the EU countries (Germany, Ireland, the Netherlands, Norway, Sweden), as well as in the UK, Japan, and Singapore, where there are environmentally friendly cities (*Table 1*), "carbon taxes (on coal, motor and heating fuels) are levied" [11]. In addition, some EU states sell carbon quotas, which are set at the national level. Carbon taxes and these quotas have a compensatory nature, so the most important task is to control the targeted use of the former within the framework of quotas.

ENVIRONMENT AND TAXATION

It should be noted that the base of environmental taxation in the OECD member states, on the territory of which the environmentally friendly cities from the sample are located (*Table 1*), covers both "environmentally destructive factors and goods and services that may cause negative impact on the environment and human health" [20]. The share of environmental taxes in the total revenue of these countries is 7.5 per cent. Since the sample (*Table 1*) includes mostly European cities (17 out of 30), let us consider the experience of environmental taxation on the example of EU countries.

The environmental taxes applied in them do not bear a significant fiscal burden, but determine the environmental policy of local governments and, in addition, stimulate the environmental behaviour of taxpayers, contribute to the reduction of technogenic and anthropogenic load on the environment [10, 18], as well as provide regulation of the process of nature management based on the rational use of resources. The functions of environmental taxes include: compensation of damage from environmental harm, accumulation of funds for the implementation of environmental protection measures of territorial

Table 1

Financial opportunities for the implementation of the powers of local self-government bodies in the countries where environmentally friendly cities are located

Country	City	Rating place	Local self-government bodies	
			The degree of financial autonomy	The degree of tax independence
Europe				
Austria	Vienna	7	Relative	Narrow
United Kingdom	Nottingham	14	High	Moderately wide
Germany	Hamburg Freiberg Berlin	1 20 26	Relative	Moderately narrow
Denmark	Copenhagen	3	Medium	Moderately wide
Iceland	Reykjavik	6		
Spain	El Hierro Oviedo	21 29	Medium	Wide
Luxembourg	Luxembourg	12	Medium	Moderately wide
Netherlands	Amsterdam	18	Low	
Norway	Oslo	22	Medium	
Finland	Helsinki	5	Medium	
France	Paris	27	Medium	
Switzerland	Geneva Zurich	8 25	Relative	Wide
Sweden	Stockholm	15	Medium	Moderately wide
North America				
Canada	Calgary Toronto	11 19	High	Wide
USA	Chicago Honolulu Portland New York	2 4 16 27		
Australia and Oceania, Asia, Africa, South America				
Australia	Brisbane	17	High	Wide
New Zealand	Wellington Auckland	24 30		
Singapore	Singapore	10	Low	Narrow
Japan	Kobe	13	Medium	Moderately wide
Morocco	Infran	23	Low	Narrow
Brazil	Curitiba	9	Relative	Moderately narrow

Source: compiled by the authors based on Political atlas of modern times. URL: http://www.hyno.ru/ [16].

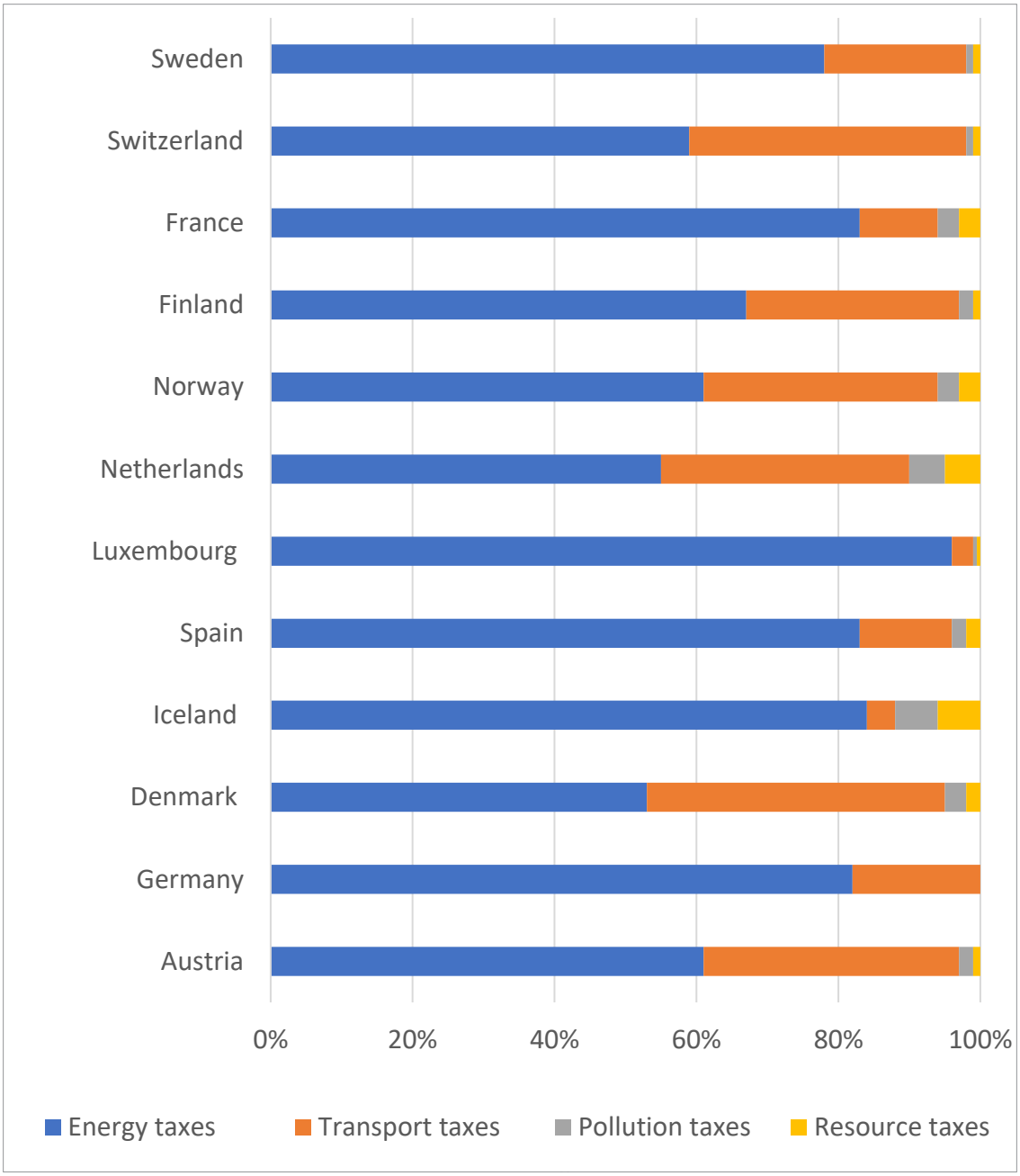

Fig. **The structure of environmental taxes in EU countries where environmentally friendly cities are located**

Source: compiled by the authors according to Statistical guide to Environmental Taxes. URL: https://ec.europa.eu/eurostat/documents/3859598/5936129/KS-GQ-13–005-EN.PDF.pdf/706eda9f-93a8–44ab-900c-ba8c2557ddb0?t=1414782946000

and spatial nature, stimulation of decisions aimed at reducing the anthropogenic load on the environment [8, 19], and are a specific part of the tax system, because along with the classical (fiscal and regulatory) play also resource-saving and controlling roles [9, 17].

According to the definition by the European Environment Agency,[8] environmental taxes are defined as "all taxes whose base has a specific

[8] European Environment Agency (official site). URL: https://www.eea.europa.eu/en

Table 2

Complex of environmental taxes applied in the UK

Name of the tax	Purpose of taxation	Stimulation of the taxpayer	Features / Results applications
Landfill tax	Reducing the volume of waste, encouraging recycling and the introduction of environmentally friendly disposal methods	Privileges are provided for companies exploiting landfills if they invest in environmental protection measures	Reduced tax revenue due to high rates of reduction in waste disposed of in landfills
Climate change tax	To incentivise measures to reduce greenhouse gas emissions	To be introduced in stages, taking into account inflation; incentives are provided for energy-intensive industries and to eliminate disproportionate distribution of the tax burden.	Charged by energy suppliers acting on behalf of the tax authority
Tax on quarrying	Incentivising the use of recycled materials and preventing the disposal of industrial waste in dumps through a tax on the extraction of sand, gravel, and crushed stone for industrial purposes	Benefits if sand, gravel, or crushed rock is obtained as a co-product of mining or construction material production, drilling, dredging, highway construction	A portion of the tax is channelled to the Sustainable Development Fund, which is used to finance environmental measures related to compensation of negative impact of mineral extraction operations

Source: compiled by the authors based on [9, 13, 21].

negative impact on the environment". They are divided into seven groups: energy taxes; transport taxes; pollution charges; charges for landfill disposal and recycling; taxes on emissions of substances that lead to global natural and environmental changes; and noise impact taxes. Energy taxes account for almost three quarters of the total number of environmental taxes, transport taxes account for a fifth, and only one twentieth are pollution and resource taxes (*see Figure below*). In the countries studied, various instruments are used to stimulate investment and innovation activities in the environmental sphere and the introduction of technologies to reduce the negative environmental impact of enterprises, including tax incentives, reduction of some taxes by increasing others, tax refunds, favourable loans, direct financing of environmental projects (grants), and subsidies [9, 20]. This makes it possible to motivate the polluting enterprise to reduce its harmful environmental impact and correct consumer behaviour (incentive taxation). In addition, a number of derivative instruments are used to ensure the financing of environmental protection measures at the expense of revenues from environmental taxes (grants and soft loans); tax rebates are provided and specialised funds that invest in the development of low-carbon economy are used [9, 21]. However, we should agree with the results of the research conducted by the Centre for Strategic Research Foundation on tax incentives for low-carbon development in Russia and abroad.[9]

The authors identify potential areas of application of foreign experience in providing tax

[9] Activities of the Centre for Strategic Developments Foundation URL: https://omorrss.ru/upload/csr-presentation-20220218.pdf?ysclid=lsxmuhjvrd658294415

incentives to stimulate low-carbon development in accordance with Russian legislation, but before developing specific solutions, they propose to assess the effectiveness of existing tax incentives for compliance with the Strategy of socio-economic development of the Russian Federation with low greenhouse gas emissions until 2050 (RF Government Order No. 3052-o of 29.10.2021)[10] [21].

Environmental taxes affect the growth rate of household waste and the level of its recycling — Denmark and the Netherlands were the first to introduce them [17, 19, 21]. Currently, they are in force in all European countries where environmentally friendly cities from the Rating 2021 are located and are aimed at reducing the volume of waste and transition from the disposal of those that are considered household waste to recycling, reuse, or recovery [13, 21]. Interesting is the experience of Great Britain, where a complex of taxes is applied: on waste disposal, climate change and development of quarries [9, 21]. The characteristic of the complex of environmental taxes, including their purpose, incentives, features of the results of their application, is presented in *Table 2*.

In Russia, separate components of this method are currently being implemented in the industrial sector of a number of regions [12, 14].

The concept of industrial symbiosis is implemented in the formation of eco-industrial parks — a network of enterprises interacting with each other to obtain economic and environmental benefits based on the exchange of energy and materials [12, 22]. In this case, by-products of production are used, a minimum of waste is generated and natural resources are saved. This is how the eco-industrial park of Kolundborg (Denmark) is organised, which received the Gothenburg Sustainability Award in 2018. Gothenburg Award for Sustainable Development — due to the industrial symbiosis of enterprises of 4 industries and recycling of waste annually, with cost savings of 24 million euros [14]. It should be noted the active participation of the municipality in the activities of the park and the construction of a heat distribution network using a secondary energy resource — steam from the power plant.

The quasi-model of industrial symbiosis between the municipality of Tanapaca in Peru and the largest US nuclear power plant Palo Verde on the use of wastewater for cooling the plant is of considerable interest. On the principles of circularity, the closed loop of the urban water supply and wastewater disposal system as an integral part of the powers of local self-government bodies in the sphere of environmental safety is implemented [11, 19].

As Y.V. Nikulichev [13] notes, from the point of view of using eco-innovations for household waste utilisation, Stockholm's experience seems interesting from the point of view of using eco-innovations for household waste utilisation, where waste packed in special containers is transported to the sorting station by vacuum method through special pipelines. There they are distributed and transferred for recycling or composting, or to an incineration plant. Eco-innovation processes are implemented on the principles of partnership between local self-government bodies and business, as the pipeline, sorting station and incinerator are owned by the municipality, while recycling and composting are performed by private business [13, p. 37]. Household waste management is carried out on an inter-municipal basis in Denmark, where this function is performed by municipalities in cooperation with private business, which makes it possible to provide heat supply to one third of the housing stock through the use of waste incineration products [23].

The introduction of foreign experience in the system of environmental safety of the city requires significant preparatory work not only

[10] Order of the Government of the Russian Federation No. 3052-o of 29.10.2021 URL: http://publication.pravo.gov.ru/Document/View/0001202111010022?ysclid=lsxn77u6fk65054163

in the legal aspect (implementation of legislative norms), but also in the organisational and economic aspect (coordination of interests of participants in the adoption and implementation of strategic and situational decisions in the environmental sphere). Some European practices of circular economy development, resource and energy saving require a comprehensive analysis of the consequences of these actions for the environment and living conditions of the urban population [20, 23], which, in particular, relates to waste recycling and its transformation into an alternative energy source in order to improve the energy efficiency of the housing stock, as it is necessary to take into account the restrictions on harmful emissions into the atmosphere.

It should also be noted that certain issues of ensuring environmental safety require the application of both administrative and legal instruments and economic methods at the same time. In this case, the former should not significantly limit the use of natural resources, but encourage economic entities to switch to environmentally friendly production. This can be achieved by creating operating conditions under which green production is more profitable than the use of outdated business practices that cause significant damage to the environment. At the same time, the system of fines and penalties for violations of legislation in the field of environmental protection should be designed in such a way as to compensate for the damage caused by such activities and, in the future, to minimise the occurrence of such environmentally unsafe situations.

CONCLUSIONS

Thus, the following conclusions can be drawn. In the OECD and EU countries, economic methods are widely enough used to manage the environmental safety of the city. They are aimed both at compensating the damage caused to the environment (air, water and soil pollution) and at stimulating measures to reduce the negative impact of anthropogenic and technogenic factors and improve the environmental situation in the territory as an integral component of sustainable urban development and ensuring comfortable living conditions for its population. Three aspects of the use of such economic methods deserve special attention:

- powers of local self-government bodies in the environmental sphere in the countries where these bodies have really wide financial autonomy;
- ecological cooperation on processing of household and industrial waste, organised on the principles of circular model of industrial symbiosis and contributing to the solution of resource saving tasks in the conditions of transition to mobilisation economy;
- environmental taxation, which allows not only to accumulate funds in the budget, but also to ensure their targeted use (implementation of environmental protection measures), as well as to stimulate the transition to the introduction of green technologies and low-carbon development.

These aspects of the application of economic methods in the management of urban environmental safety abroad have both advantages and difficulties in implementation, strengths, and weaknesses, which should be comprehensively taken into account by local governments together with authorised state bodies when making decisions on their adaptation for the practice in Russian cities. At the same time, it is necessary to assess the multidimensionality in the application of the considered economic methods and differentiation of approaches, taking into account the existing environmental situation in the city due to both differences in the level of environmental impact of technogenic and anthropogenic load factors and administrative, economic and organisational opportunities

for its reduction. This should be the subject of further research.

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Topical issues of the formation of an effective economic and social policy in Cambodia

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ABSTRACT

Cambodia, currently classified as a lower-middle-income developing country, aspires to reach upper-middle-income status by 2030. To achieve this ambitious goal, the Cambodian government has embraced an open market economic system and prioritized attracting foreign investments as well as encouraging final consumption expenditure (FCE) and stimulating the level of industries, including construction. This study aims to find out the influences of the fluctuations of foreign direct investment (FDI), FCE, and industry (including construction) (IIC) on gross domestic product (GDP) growth in Cambodia and to identify the key factors that can increase FDI, FCE, and IIC growth. The study employs descriptive and correlational analysis, mainly focusing on statistical analyses by constructing an econometric model. The results indicate that Cambodia's GDP is directly and positively impacted by the FDI, FCE, and IIC, according to the analysis of the specification of the econometric model using a linear mathematical equation. The study concludes that the Cambodian government's attention to strategic policies and initiatives in promoting FDI, FCE, and IIC, ultimately leading to a higher overall economic growth rate, is crucial. Factors such as political stability and governance, regulation and legal framework, infrastructure, human capital development, market access, public-private partnership, fiscal policy, and social protection should be at the forefront of the Cambodian GDP development roadmap.

Keywords: foreign direct investment; final consumption expenditure; industry (including construction); gross domestic product; strategic policy; market economy; Cambodia; Southeast Asia

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INTRODUCTION

Situated in Southeast Asia, Cambodia boasts a developing market economy that has witnessed substantial growth in recent decades. This upward trajectory can be largely attributed to the expansion of key industries like textiles, tourism, agriculture, and construction. Cambodia's economic landscape has undergone a significant transformation, shifting away from its historical dependence on agriculture towards a more diversified model, fostering overall development.[1] In 2021, Cambodia's gross domestic product (GDP), measuring the total monetary value of goods and services produced within a year, stood at $ 26.96 billion.[2] While experiencing rapid growth, per capita income remains relatively low compared to neighboring countries. Textiles and tourism reign supreme as the two largest sectors, while agriculture continues to serve as the primary source of income for many residing in rural areas [1]. Furthermore, trade-related activities and catering services constitute a significant portion of the service industry. Recent discoveries of offshore oil and natural gas deposits hold the potential to further shape the nation's economic future.[3]

In 1995, Cambodia embarked on a pivotal transformation, transitioning from a planned economy to its current market-driven structure. This shift, implemented when the GDP stood at $ 2.92 billion, aimed for ambitious growth of 7%. Remarkably, inflation plummeted from 26% in 1994 to just 6% in 1995 [2]. A surge in foreign aid fueled imports, while exports,

[1] Getting Started. U.S. Embassy in Cambodia (official site) 18.02.2024. URL: https://kh.usembassy.gov/business/getting-started-cambodia/

[2] GDP (Current US$) — Cambodia. The World Bank (official site). 10.04.2023. URL: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=KH

[3] Gronholt-Pedersen J. Cambodia Aims for Offshore Production Next Year. WSJ. 26.09.2012. URL: https://www.wsj.com/articles/SB 10000872396390443507204578020023711640726

particularly from the apparel industry, witnessed a parallel rise. Despite consistent economic progress, Cambodia's contribution to the ASEAN economy remained modest in 2016, accounting for only 0.71% compared to its neighbor Indonesia's 37.62% share [3]. However, this burgeoning growth faced a setback in 1997–1998 due to the regional economic crisis, compounded by civil unrest and political instability. These factors, coupled with a decline in foreign investments and a drought impacting the 1998 harvest, caused the economy to decelerate. Nevertheless, 1999, marking the first full year of relative peace in three decades, saw renewed success in economic reforms. This paved the way for a 4% growth trajectory, demonstrating Cambodia's resilience and potential [4].

Cambodia's current foreign policy prioritizes cultivating amicable relations with its immediate neighbors, Thailand and Vietnam, alongside integration into the World Trade Organization's trade blocs. This strategy aims to bolster its burgeoning economy, which faces crucial challenges. One such challenge is the lack of a skilled workforce, particularly in impoverished rural areas with inadequate basic infrastructure. The education system requires strengthening to bridge this gap. Despite these hurdles, Cambodia continues to attract investors due to its competitive advantages: low wages, readily available labor, proximity to Asian raw materials, and favorable tax policies [5]. Foreign direct investment (FDI), final consumption expenditure (FCE), and industry (including construction) (IIC) act as key drivers of the Cambodian economy. Analyzing the impact of these factors on Cambodia's GDP is crucial for policymakers, investors, and stakeholders to formulate informed decisions and strategies that fuel further economic development.

The research objectives of this study are as follows:

- To theoretically review the relationship between FDI, FCE, and IIC with GDP in Cambodia.
- To analyze the impact of FDI, FCE, and IIC on Cambodian GDP with the specification of the econometrics model using a linear mathematical equation.
- To reveal the role of FDI, FCE, and IIC in stimulating Cambodia's GDP.
- To identify key factors and strategies driving FDI, FCE, and IIC growth.

LITERATURE REVIEW

The movement of multinational corporations (MNCs) from developed to developing countries like Cambodia is a significant aspect of the current era of globalization [6]. MNCs help facilitate a substantial amount of FDI, which involves a foreign investor holding a significant level of control and a long-term interest in a company from another country. MNCs benefit from FDI as a means of expanding their footprints into international markets.[4] Developing countries have encouraged FDI as a means of financing the construction of new infrastructure and the creation of jobs for their local workers [7]. FDI has played a crucial role in Cambodia's economic growth. Studies have shown that FDI attracted to Cambodia's labor-intensive industries, where it has comparative advantages, has contributed to the country's sustained and robust growth performance [8]. FDI can stimulate economic growth through complementing domestic savings, facilitating technology transfer, increasing competition, reducing prices, and boosting entrepreneurship [9]. Investment promotion through the special economic zone (SEZ) mechanism has positively affected FDI inflow and diversification across Cambodia [10]. In terms of labor market outcomes, FDI has been found to increase wages and the probability of working in the formal sector for both the garment sector and other manufacturing sectors in Cambodia, but it has not helped reduce the gender wage gap [11]. Nonetheless, FDI can have varying impacts on GDP growth depending on the type of FDI that flows into Cambodia. Different types of FDI, such as greenfield investments, mergers and acquisitions, or joint ventures, can have distinct effects on the economy [12]. FDI that focuses on export-oriented industries, like garment manufacturing, can significantly contribute to GDP growth by increasing exports and generating foreign currency. In contrast, FDI in resource extraction may have a smaller impact on overall GDP growth, especially if the resources are simply exported without being processed domestically [13]. On the other hand, mergers and acquisitions may result in efficiency gains through restructuring but

[4] Foreign Direct Investment (FDI). OECD iLibrary. 11.04.2023. URL: https://www.oecd-ilibrary.org/finance-and-investment/foreign-direct-investment-fdi/indicator-group/english_9a523b18-en

could also lead to job losses or reduced competition in certain sectors [14]. Furthermore, factors such as the availability of skilled labor, infrastructure development, institutional quality, and regulatory frameworks play a crucial role in determining how well Cambodia can absorb and leverage foreign investments for economic growth. A higher absorptive capacity enables the country to maximize the positive impact of FDI on productivity, innovation, and overall economic performance [15]. Additionally, the broader economic environment in Cambodia, including macroeconomic stability, trade policies, investment climate, political stability, and legal framework, influences how FDI contributes to GDP growth. A favorable economic environment characterized by low inflation rates, stable exchange rates, transparent regulations, and investor-friendly policies attracts more FDI inflows and creates a conducive atmosphere for sustainable economic expansion [16]. Given that FDI has long been recognized as a major source of capital accumulation that contributes to the economic growth of the host economy, Cambodia has made concerted efforts to eliminate barriers to FDI, enhance domestic economic policies and regulations, promote the expansion of the financial sector, and establish environments conducive to attracting FDI [17].

The health of Cambodian economy, in addition, hinges on FCE, the total amount spent by households, businesses, and the government on goods and services [18]. As one of the three pillars of GDP, alongside gross investment and net exports, FCE plays a critical role in determining a nation's economic performance [19]. As consumers raise their spending, businesses experience an uptick in revenue, resulting in a cascade of positive effects on the economy. Increased business earnings translate to higher tax collections, both directly and indirectly, which in turn contributes to the country's economic growth [20]. As companies witness profit maximization, they can further invest in their infrastructure and expand their operations, leading to more job opportunities with higher salaries [21]. Furthermore, the increased disposable income of workers can stimulate further spending, leading to even more economic activity. This cycle of spending and revenue growth further reinforces the economy's upward trajectory [22]. Fiscal reforms in Cambodia, particularly those aimed at increasing infrastructure spending through property taxes, can have a significant positive impact on the country's economic growth and inequality reduction [23]. When Cambodia invests more in infrastructure, the government can improve access to basic services such as transportation, healthcare, and education, which can in turn create jobs and stimulate economic activity [24]. Additionally, imposing progressive property taxes helps the government generate revenue that can be used to fund social programs that benefit low-income households, thus reducing inequality [25]. These reforms have the potential to not only improve the lives of Cambodian citizens but also attract foreign investment and boost the country's overall economic competitiveness [26]. Any significant, unjustified changes in FCE can therefore trigger positive or negative ripples through the economy. A steady rise in FCE signals rapid economic expansion and growing consumer confidence. Conversely, a decline in FCE can be an indicator of a market slump brought on by reduced spending on goods and services.[5] Recognizing this intricate relationship is crucial for understanding the health of an economy and implementing policies that promote sustainable growth and development. Nevertheless, the impact of FCE on GDP growth can vary depending on what people and businesses are spending on. Spending on domestically produced goods and services has a more significant impact on GDP compared to spending on imported goods because domestic spending stimulates local production, employment, and reinvestment within the Cambodian economy [27]. Moreover, if income inequality is high, a significant portion of the population may have limited disposable income to spend, dampening the overall impact of FCE on GDP growth [28]. During economic booms, increased consumption can further fuel growth. In contrast, during recessions, even a rise in FCE might not significantly boost GDP if businesses are hesitant to invest due to overall economic uncertainty [29].

Cambodia has experienced solid economic growth since the 1990s, driven by export expansion, FDI inflows, and industrialization. The garment industry has played

[5] What Is the Relationship between GDP and Consumption? SmartCapitalMind. 28.12.2023. URL: https://www.smartcapitalmind.com/what-is-the-relationship-between-gdp-and-consumption.htm

a significant role in the country's manufacturing sector development [8]. The government has emphasized the importance of the labor-intensive manufacturing sector in its industrial policy [30]. The country has recognized the need to improve its human capital to support long-term growth in technologically advanced industries [31]. Furthermore, there is a growing focus on the development of Industry 4.0 technologies in Cambodia, including automation, artificial intelligence, and smart factories [32]. The construction sector has also been a key contributor to the economy, with investments in housing serving as an engine of growth [8]. The housing sector is an important aspect of Cambodia's industrial development, with a need to improve housing conditions and access to quality materials and water. The Better Factories Cambodia program has been instrumental in improving working conditions in the country's exporting factories.[6] The electricity, water, and gas sectors have also seen development, with efforts to improve access to regional markets and promote export product diversification [33]. The mining subsector, along with the manufacturing (mostly garments), electricity, gas, and water, and the construction subsectors, increased by 18.3%, 13.4%, 16.4%, and 15.3% respectively from 2004 to 2007 [34]. In terms of electricity generation, Cambodia relies heavily on hydropower and coal, with coal accounting for 48.1% and hydro accounting for 47.4% of electricity generation in 2015 [35]. The water supply sector in Cambodia faces challenges, with low access to piped water supply, particularly in rural areas [36]. However, the private sector plays a significant role in providing piped water services, with around 300 private sector utilities serving almost 50% of those with access to piped services [37]. The International Standard Industrial Classification (ISIC) divisions 05–43 encompass the industry sector, which also includes construction. This category comprises the value added in industries such as manufacturing, construction, electricity, mining, water, and gas. The net output of a sector is calculated as the sum of all sector outputs, reduced by any intermediate inputs. This estimation does not account for natural resource depletion or damage to manufactured assets.[7] Cambodia's industrial sector has been instrumental in driving economic growth and attracting investments, contributing to the country's rapid development.

MODEL CONSTRUCTION AND TESTS

1. The quantitative variables characterized the object of the study

Cambodia is a developing nation with an open economic system that employs various quantitative variables including F, C, and I to measure economic activity over a specific period. These variables correspond to the level of FDI, FCE, and IIC, respectively. In this section, the study is going to quantitatively analyze the impact of FDI, FCE, and IIC on GDP, represented by Y in *Table 1*, of Cambodia because:

- FDI: Understanding the level and impact of FDI in Cambodia's economy is essential as it reflects the confidence of foreign investors in the country's economic prospects.
- FCE: Analyzing FCE provides insights into the domestic demand and consumption patterns within Cambodia.
- IIC: Studying this indicator helps in understanding the contribution of industrial activities to the economy, employment generation, productivity levels, and overall economic diversification.

Table 1

Endogenous and Exogenous Variables in the Econometric Model

Endogenous Variable	Exogenous Variable
Y_t	F_t
-	C_t
-	I_t

Source: compiled by the authors.

[6] Better Factories Cambodia. International Labour Organization. 14.10.2008. URL: http://www.ilo.org/asia/projects/WCMS_099340/lang — en/index.htm

[7] Industry (Including Construction), Value Added (Current US$) — Cambodia. The World Bank. 10.04.2023. URL: https://data.worldbank.org/indicator/NV.IND.TOTL.CD?locations=KH

Table 2

Cambodia's Official Statistics Collected from World Bank

Year	Billion USD	Billion USD	Billion USD	Billion USD
	GDP	FDI	FCE	IIC
	Y_t	F_t	C_t	I_t
2008	10.35	0.82	8.22	2.32
2009	10.4	0.93	7.92	2.25
2010	11.24	1.4	9.14	2.46
2011	12.83	1.54	10.63	2.84
2012	14.05	1.99	11.26	3.23
2013	15.23	2.07	11.97	3.67
2014	16.7	1.85	12.95	4.28
2015	18.05	1.82	13.86	5
2016	20.02	2.48	15.24	5.9
2017	22.18	2.79	16.28	6.84
2018	24.57	3.21	17.37	7.93
2019	27.09	3.66	18.82	9.27
2020	25.87	3.62	17.98	8.94
2021	26.96	3.48	17.57	9.93

Source: The World Bank. 10.04.2023. URL: https://data.worldbank.org

Table 3

Results of Regression Model Analysis Using Cambodia's Official Statistics

	Intercept	F	C	I
Coefficients	1.123303	0.060287	0.751628	1.139359
Standard Error	0.491508	0.255601	0.078958	0.115428
t Stat	2.285421	0.235864	9.519324	9.870707
P-value	0.048134	0.818818	5.38E-06	3.99E-06
F	3683.635363			
Significance F	3.23478E-14			
Multiple R	0.999593042			
R Square	0.99918625			
Adjusted R Square	0.998915			
Standard Error	0.195034065			

Source: compiled by the authors.

2. The economic laws and equation of the econometric model

Before being able to estimate the specification of a simplified macro-model that allows explaining the values of Y by the quantities of F, C, and I, the following statements of economic theory are predicted:

1) A rise in FDI would yield a higher GDP growth rate.

2) The current GDP is explained by the level of FCE. The higher the FCE is, the greater the GDP level will be.

3) The amount of GDP is directly proportional to the increase in IIC.

The equation of the econometric model is:

$$\begin{cases} Y_t = a_0 + a_1 F_t + a_2 C_t + a_3 I_t + \varepsilon_t \\ a_0, a_1, a_2, a_3 > 0 \\ E(\varepsilon_t) = 0;\ \sigma(\varepsilon_t) = \text{const.} \end{cases}$$

3. Testing of the regression model based on World Bank data in *Table 2*

Based on data analysis function in Microsoft Office Excel:

$$\begin{cases} Y_t = 1.12 + 0.06 F_t + 0.75 C_t + 1.14 I_t + \varepsilon_t \\ (0.49)(0.26)(0.08)(0.12)(0.2) \\ Adjusted\ R\ ^\wedge\ 2 = 0.9989;\ F = 3684 \end{cases}$$

R-squared test:

In *Table 3*, the Adjusted R Square equals 0.9989, meaning that 99.89% of changes in Cambodia's GDP are explained by changes in FDI, FCE, and IIC of Cambodia by a linear regression model.

F-test (proving significance of R-squared):

$$F = 3684;\ F_{Crit} = 3.86;$$
$$P\text{-}value\ of\ F = 3.23\text{E-}14 = 3.23 \times 10^{-14}.$$

The *F* amount is greater than the critical value of Fisher distribution. Therefore, the R-squared is non-random, and the quality of the specification of the model is high.

Not differently, as the *P-value of F* is less than the level of significance (alpha), 0.01, 0.05, and 0.1, it proves that the above conclusion about the R-squared and the quality of the specification of the model is correct.

Adequacy test:

$$Y_{2021} = 27.4;\ \hat{Y}_{2021^-} = 26.96;\ \hat{Y}_{2021^+} = 27.84.$$

The real value of the GDP of Cambodia in 2021 lies between two boundaries of the confidence interval. The model is, therefore, adequate at a 95% confidence interval.

t-test:

Table 4

Results for t-test Analysis

	t Stat	T_{Crit}	P-value
Intercept	2.29	2.26	0.05
F	0.24	2.26	0.82
C	9.52	2.26	5.38E-06
I	9.87	2.26	3.99E-06

Source: compiled by the authors.

As shown in *Table 4*, the absolute values of the t Stat of intercept, FCE, and IIC are more than the critical value of student distribution, so the coefficients of the intercept, FCE, and IIC are significant.

In addition, the absolute values of the P-value disclose that the P-value of the intercept, the FCE, and the IIC are less than the alpha value, not differently, meaning that the coefficients of the intercept and the exogenous variable of the FCE and the IIC are significant.

First Gauss-Markov condition:

$$\begin{cases} Y_t = a_0 + a_1 F_t + a_2 C_t + a_3 I_t + \varepsilon_t \\ E(\varepsilon_t) = 0 \end{cases}$$

The first Gauss-Markov statement claims that the mathematical expectation of the disturbance term in any observation should equal zero, $E(\varepsilon_t) = 0$.

Based on the calculations, the average of the residual values is approximately equal to zero, then the first Gauss-Markov condition is confirmed.

Second Gauss-Markov condition (Goldfeld-Quandt test):

$$\begin{cases} Y_t = a_0 + a_1 F_t + a_2 C_t + a_3 I_t + \varepsilon_t \\ \sigma^2(\varepsilon_t) = \text{const.} \end{cases}$$

The second Gauss-Markov condition claims that the variance of the disturbance term should be constant for all observations.

$Var\ (\varepsilon_t)$ = const.

or $\sigma^2\ (\varepsilon_t)$ = const.

Additionally, the Goldfeld-Quandt test (GQ-test) is applied to make sure whether the second Gauss-Markov condition is confirmed. Therefore, the values of *GQ* and 1/*GQ* with a critical value of Fisher distribution are needed to compare.

According to the *GQ*-test, the results show that:

$$GQ = 0.65;\ 1/GQ = 1.53;\ F_{Crit,GQ} = 19$$

The level of $F_{Crit,\ GQ}$ is greater than the *GQ*, and greater than the 1/*GQ* value. Therefore, the residuals are homoscedastic, the second Gauss-Markov condition is satisfied, and regression coefficients are unbiased, consistent, and efficient.

Third Gauss-Markov statement (Durbin-Watson test in *Table 5*):

The third Gauss-Markov condition states that residuals are distributed independently.

$Cov\ (e_i, e_j) = 0;\ i \neq j$

$DW = 1.817$.

The distribution of the Durbin-Watson statistic is always between 0 and 4.

The *DW* constant of 1.817 lies between du and 4-du, so there is no autocorrelation in the residuals. In conclusion, the third Gauss-Markov condition is confirmed, and the coefficients of the regression model are unbiased, consistent, and efficient. In other words, the values of the regression coefficients are trustworthy.

Economic interpretation of the coefficients:

$$Y_t = 1.12 + 0.06F_t + 0.75C_t + 1.14I_t + \varepsilon_t$$

Depending on the actual values of official statistic in Cambodia, the economic interpretation of the coefficients is supposed that:

- If the FDI increases by 1 billion USD, the GDP will rise by 0.06 billion USD.
- If the FCE rises by 1 billion USD, the GDP will increase by 0.75 billion USD.
- If the IIC goes up by 1 billion USD, the GDP will rise by 1.14 billion USD.

THE ROLE OF FDI, FCE, AND IIC IN FOSTERING CAMBODIAN GDP AND WAYS TO PROMOTE THEIR GROWTH

1. FDI and GDP

FDI plays a crucial role in driving economic growth by attracting external capital that can be utilized to invest in new technologies, infrastructure, and various industries. It complements domestic savings, increases competition, reduces prices, and boosts entrepreneurship. The study reveals that FDI has a positive impact on Cambodia's GDP growth, according to the result of the economic interpretation of the coefficient of FDI in the econometric model. 1 billion USD of FDI increase enabled an increase in GDP by approximately only 0.06 billion USD states that the Cambodian economy limitedly benefits from FDI because of the types of FDI, absorptive capacity,

Table 5

Durbin-Watson Critical Regions

Positive Autocorrelation		No Evidence of Autocorrelation			Positive Autocorrelation	
0	d_l	d_u	2	4-d_u	4-d_l	4
0	0.715	1.816	2	2.184	3.285	4
	Inconclusive			Inconclusive		

Source: compiled by the authors.

and the overall economic environment of Cambodia connected to the theoretical findings of some studies mentioned in the literature review. Therefore, the government should implement reforms to attract more FDI that has been attracted to sectors in which Cambodia has a comparative advantage, further enhancing economic growth. Inward FDI from China, South Korea, and Japan has contributed to Cambodia's economic growth, along with factors such as bilateral trade, exchange rate, inflation rate, and labor force [38]. This influx of foreign investment mostly leads to increased productivity levels within the economy, ultimately contributing to overall GDP growth. When foreign companies establish operations in a host country like Cambodia, they typically create employment opportunities for the local population. This not only reduces unemployment rates but also boosts consumer spending, which further fuels economic activity. Moreover, these foreign firms often engage in exporting goods and services back to their home countries or other markets, thereby increasing the nation's export revenue and positively impacting GDP.

FDI has been a primary driver of Cambodia's economic growth, contributing significantly to the country's development. Several important factors can lead to an increase in Cambodia's FDI, including:

- Democratic improvement: Increase the level of democracy of political governance and promote human rights to attract more European investors.[8]
- Streamlining bureaucracy: Reduce red tape and simplify business registration processes to make it easier for foreign investors to set up the enterprise.
- Infrastructure development: Invest in infrastructure like transportation networks, power grids, and communication systems to improve connectivity and lower operating costs for businesses.
- Skilled workforce development: Strengthen education and training programs to equip the workforce with the skills and knowledge that foreign companies need.
- Tax incentives: Offer competitive tax rates, tax breaks, or SEZs to incentivize foreign investment in targeted sectors.
- Investment protection: Provide strong legal frameworks and institutions that protect foreign investors' property rights and ensure fair treatment.
- Transparency and predictability: Uphold clear and consistent regulations and policies to create a predictable business environment for foreign investors.
- Focus on priority sectors: Identify main sectors with high growth potential, like manufacturing, tourism, or renewable energy, and tailor policies and incentives to attract FDI in those areas.
- Promoting sustainability: Balance economic development with environmental and social considerations to attract environmentally conscious investors.

2. FCE and GDP

FCE represents the spending of households, businesses, and the government on goods and services within the economy. In the context of Cambodia, FCE contributes significantly to the country's GDP by driving economic growth and supporting various sectors of the economy. FCE ranks second as a driver of Cambodia's GDP compared to the potential of FDI and IIC, based on the economic interpretation of the coefficients that its 1 billion USD increase can raise Cambodian GDP by around 0.75 billion USD. As consumer confidence and disposable incomes rise, people tend to spend more, which stimulates production and creates demand for goods and services. This increased demand encourages businesses to expand production, hire more workers, and invest in further growth. When consumers spend money, businesses earn revenue. The revenue of these businesses allows them to invest in additional resources, hire more employees, and pay salaries. The newly hired employees then spend their wages on goods and services, further stimulating demand in other sectors. This process creates a ripple effect that can amplify the initial impact of FCE on GDP. As businesses experience rising demand due to higher spending, they may be incentivized to invest in expanding their production capacity or developing new products. This investment creates jobs, stimulates further economic activity, and ultimately contributes to long-term GDP growth.

[8] The European Union and Cambodia. EEAS. 22.03.2024. URL: https://www.eeas.europa.eu/cambodia/european-union-and-cambodia_en?s=165

The government can utilize its spending to invest in infrastructure, education, healthcare, and social programs. These investments create jobs, improve living standards, and stimulate private consumption, ultimately contributing to overall GDP growth.

The growth of FCE uppers demand for goods and services across many sectors such as retail, manufacturing, agriculture, and services. The trend of its growth can be attributed to various factors such as increasing household incomes, government spending, tourism, foreign investment, and rising urbanization.[9] Increasing FCE in Cambodia can be achieved through various effective strategies such as:

- Promoting financial inclusion: Enhancing access to financial services, such as banking accounts, credit facilities, and insurance products, can help increase consumer purchasing power and stimulate consumption expenditure.
- Investing in education and skills development: Improving the education system and providing vocational training programs can enhance the skills and productivity of the workforce, leading to higher incomes and increased spending on goods and services.
- Supporting small and medium enterprises (SMEs): Providing support to SMEs through access to finance, business development services, and market linkages can help boost entrepreneurship, create jobs, and drive consumer demand.
- Infrastructure development: Investing in infrastructure projects, such as transportation networks, energy systems, and telecommunications facilities, can improve connectivity, reduce transaction costs, and stimulate economic activities that contribute to higher consumption levels.
- Enhancing social protection programs: Implementing social safety nets, such as cash transfer programs or unemployment benefits, can provide a buffer against economic shocks and income volatility, thereby supporting household consumption levels.

3. IIC and GDP

The IIC sector in this study has a significant relationship to GDP in Cambodia, with evidence from the economic interpretation of the IIC coefficient demonstrating that GDP will increase by 1.14 billion USD approximately if the IIC rises by 1 billion USD. Moreover, the breakdown of GDP contributions by sectors in Cambodia in 2021 reveals that the IIC contributed 36.83%, the services sector contributed around 34.18%, and agriculture contributed 22.85%.[10] This distribution underscores the pivotal role played by the industry sector in driving economic growth and development in Cambodia. The IIC sector comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas.

Mining in Cambodia plays a significant role in the country's industrial sector. The mining industry in Cambodia includes the extraction of various minerals such as gemstones, gold, iron, and bauxite. These minerals contribute to the overall value added in the industry sector by providing raw materials for manufacturing processes and exports. However, the mining sector in Cambodia has faced challenges related to environmental sustainability and regulation to ensure responsible mining practices.

Manufacturing is a crucial component of Cambodia's industrial landscape, encompassing a wide range of activities from textiles and garments to electronics and food processing. The manufacturing sector adds substantial value to the economy by creating employment opportunities and generating exports. The manufacturing industry benefits from Cambodia's strategic location, favorable trade agreements, and a relatively low-cost labor force. However, there have been concerns about labor conditions and the need for diversification within the manufacturing sector to enhance competitiveness.

The construction industry in Cambodia has experienced rapid growth in recent years, driven

[9] Cambodia Economic Update: Recent Economic Developments and Outlook. The World Bank. 27.06.2022. URL: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/843251556908260855/cambodia-economic-update-recent-economic-developments-and-outlook

[10] Cambodia — Share of Economic Sectors in the Gross Domestic Product. Statista. 8.12.2023. URL: https://www.statista.com/statistics/438728/share-of-economic-sectors-in-the-gdp-in-cambodia/

by infrastructure development, real estate projects, and urbanization. Construction activities contribute significantly to the value added in the industrial sector by creating demand for materials, labor, and services. The construction sector plays a vital role in supporting economic growth, attracting investment, and improving living standards. Challenges in the construction industry include issues related to quality standards, safety regulations, and sustainable urban planning.

Electricity generation is a critical component of Cambodia's industrial infrastructure, providing power for industrial processes, commercial activities, and residential consumption. The electricity sector in Cambodia includes both conventional sources such as thermal power plants as well as renewable energy sources like hydropower and solar energy. Ensuring a reliable and affordable electricity supply is essential for supporting industrial growth and enhancing productivity across various sectors.

Water resources management is essential for sustaining industrial activities in Cambodia, particularly agriculture, manufacturing, and energy production. Efficient water management practices are crucial for ensuring adequate water supply for industrial processes while maintaining environmental sustainability. Issues such as water pollution, scarcity during dry seasons, and climate change impacts pose challenges to effective water resource management in Cambodia.

The gas sector in Cambodia includes activities related to natural gas exploration, production, distribution, and consumption. Natural gas plays a role in diversifying the energy mix and reducing dependency on traditional fossil fuels. Developing the gas sector can contribute to energy security, environmental sustainability, and economic growth by providing cleaner energy options for industrial processes and power generation.

One key driver contributing to the growth of the industry sector in Cambodia is foreign investment, particularly in industries such as garment manufacturing and construction. Government initiatives collectively contributing to creating a favorable environment for industries in Cambodia play a crucial role in fostering growth within the IIC sector, leading to overall economic growth. To promote the industry sector, the Cambodian government has, therefore, implemented several initiatives, such as:

- Industrial Development Policy: Cambodia's Industrial Development Policy focuses on promoting industrial diversification, enhancing competitiveness, and increasing value addition in the industry sector. The policy aims to attract FDI by offering incentives and creating a conducive business environment for industries.
- SEZs: The government has established SEZs across the country to attract investment and promote industrial development. SEZs offer various incentives such as tax breaks, streamlined regulations, and infrastructure support to encourage businesses to set up operations within these zones.
- Skills development programs: The government has implemented skills development programs aimed at providing a skilled workforce for industries. Through the investment in education and training programs, Cambodia aims to enhance the capabilities of its workforce and meet the evolving needs of industries.
- Infrastructure development: The government is focusing on improving infrastructure such as roads, ports, and utilities to support industrial activities. Enhancing infrastructure not only facilitates the movement of goods and services but also reduces operational costs for businesses operating within the sector.
- Promotion of renewable energy: In line with its commitment to clean energy transition, Cambodia is promoting renewable energy sources such as solar power. Initiatives like the "Principles for Permitting the Use of Rooftop Solar Power" aim to regulate and encourage the adoption of solar energy technologies within the industry sector.
- Investment promotion policies: The government has put in place investment promotion policies that aim to attract both domestic and foreign investments in key industries. When offering incentives such as tax holidays, duty exemptions, and investment protection guarantees, Cambodia seeks to stimulate investment flows into the industry sector.

CONCLUSIONS AND RECOMMENDATIONS

With the regression model construction and analysis and results discussion, the study investigates the sectors, such as FDI, FCE, and IIC, influencing GDP growth in Cambodia and determines the strategic ways to attract FDI, promote FCE, and boost IIC activities. FDI has a positive and direct impact on economic growth in Cambodia in the long run by providing capital, fostering innovation, and creating jobs to strengthen various sectors and boost exports. This positive impact is further amplified when the government prioritizes attracting FDI in sectors aligned with Cambodia's comparative advantages. However, how the FDI impacts GDP growth in Cambodia may depend on the type of FDI, the country's absorptive capacity, and the overall economic environment that should be optimized by the Cambodian government. The study demonstrates that policies related to democratic improvement, streamlining bureaucracy, infrastructure development, skilled workforce enhancement, tax incentives, investment protection, transparency and predictability, focus on priority sectors, and promoting sustainability are helpful for Cambodian FDI promotion, ultimately achieving upper-middle-income status by 2030 as planned.[11]

Not differently, FCE positively and significantly impacts economic development in Cambodia by driving aggregate demand, stimulating production, encouraging investment, improving living standards, and fostering economic diversification. FCE's positive influence stems from its ability to stimulate production across various sectors, fueled by consumer confidence and rising disposable incomes. This process creates a ripple effect where businesses invest in growth, hire more workers, and ultimately contribute to long-term GDP expansion. However, the FCE amount, composition of FCE, and economic context can differentiate the level of the impact of FCE on Cambodian GDP. Through the implementation of effective strategies like promoting financial inclusion, investing in skills development, supporting SMEs, developing infrastructure, and enhancing social safety nets, Cambodia can ensure continued growth in FCE and solidify its role as a key driver of the nation's economic prosperity.

The growth of the IIC has, as well as, had numerous positive impacts on the economy. According to the results of the economic interpretation of the coefficients, the IIC sector has significantly contributed to Cambodian GDP, ranking number one as the most powerful sector compared to FDI and FCE. This IIC sector in Cambodia benefits from various activities such as mining — which provides raw materials, manufacturing — creating job opportunities and boosting exports, construction — fueling infrastructure development, reliable electricity generation for both industry and households, efficient water management for various sectors, and a developing gas sector that offers cleaner energy and economic opportunities. Implementing strategic government initiatives such as the Industrial Development Policy, SEZs, skills development programs, infrastructure development, promotion of renewable energy, and investment promotion policies can help Cambodia promote industrial diversification, enhance competitiveness, and increase the value addition in the industry sector.

Further research should be conducted in these fields to achieve a better and joint understanding of the way FDI, FCE, and IIC influence the GDP growth rate in Cambodia. To receive grounded and in-depth studies about these sectors, the Cambodian government should promote the relevant research interests and initiate some research funds aimed at encouraging highly qualified foreign and Cambodian researchers to conduct more professional studies, causing the Cambodian government easier to make informed decisions in imposing the governmental policies effectively and efficiently.

[11] The World Bank In Cambodia. Overview. The World Bank. 12.04.2023. URL: https://www.worldbank.org/en/country/cambodia/overview

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Definition and Key Attributes of Impact Investments as an Object of Management

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ABSTRACT

Since the introduction of the term "impact investments" into active use in 2007, the debate about their content and distinctive characteristics in comparison with other classes of investments remain open. To date, there are many different, and in some cases incompatible, points of view in interpreting their definition. This complicates the effective management of impact investments and hinders the pace of industry scaling. **The purpose of the paper** is to analyze and systematize theoretical and practical approaches to defining the concept of impact investments, as well as to identify their inherent demarcation features that determine the management features and peculiarities. **The research methodology** includes the analysis of publications in peer-reviewed scientific journals, comparison of the content of reports and reports of international organizations and institutions, as well as quantitative and qualitative content analysis of media materials relevant to this topic. **The results** obtained indicate the validity of accepting impact investments as an independent conceptual category and the expediency of their allocation and separation into an independent class of investments; their key attributes are established; the principles and features of the management approach applied to them are revealed. The paper has **practical significance** for actors and participants of the investment sphere as well as researchers and practitioners interested in innovative approaches to investing in social and environmental well-being.

Keywords: impact; impact investment; impact investment management; impact investing; transformative investments

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INTRODUCTION

The modern financial world is rapidly evolving, and with it, new investment concepts and strategies are developing. One such innovation is the concept of impact investing, which goes beyond the traditional notion of profit to include aspects of social and environmental responsibility. In the context of the growing need for sustainable development and increasing social awareness, impact investments are gaining interest and relevance. They help finance projects and businesses that improve quality of life, combat inequality, support vulnerable groups and protect the environment, and open up new opportunities for investors who seek to combine financial success with positive social impact.

However, according to a survey conducted by the DUGUUD investment fund in 2021 among 3,000 respondents, only 10% had heard the term "impact investing" and could explain it in their own words [1]. In Russia, the situation is further complicated by the foreign origin of the phrase and the resulting difficulties in translating it into Russian. In modern literature, the complex and relatively new economic category "impact investing" is often interpreted insufficiently clearly or excessively narrowly, emphasising only some of its semantic aspects. Therefore, to clarify its content it is necessary to consider the main characteristics that form its essence as an object of management.

This study attempts to analyse and systematise various approaches to understanding impact investments in order to identify not only the diverse views and points of view on this concept, but also the discussions present in the scientific and practical community, as well as to identify common trends. The author consistently outlines the arguments of proponents of considering impact investments as a synonymous and independent class of investments, identifies and discloses their key characteristics and existing typologies, and concludes that it is advisable to adopt them as an independent conceptual category with specific features of management.

The contribution to the alignment and harmonisation of the thesaurus applied in the industry thus contributes to overcoming barriers to the development of the impact investment market in the Russian Federation.

METHODOLOGY FOR CONDUCTING CONTENT ANALYSIS

The following terms were used as search units for the subsequent content analysis:

- impact investing (in ENG);
- impact investment (in ENG);
- impact investing (in RU);
- impact investment (in RU);
- transformative investing (in RU);
- transformative investments (in RU).

Online searches were performed in Google and Google Scholar with the assumption that publication statistics in Google Scholar would show the dynamics of the level of interest of the scientific community, while the number of mentions in Google would reflect the degree of involvement of a wider audience. Verbatim's phrase search tool was used to remove personalised, corrected, suggested, related and non-inclusive results. Word forms were enclosed in graphic inverted commas.

From the obtained set of articles, monographs, various reports, and case studies posted by individuals and institutional units (government agencies, investment funds and consulting firms), both scientific materials published during 2021–2022 and those referenced in the analysed publications when formalising the concept of impact investing and its distinctive characteristics (regardless of their age) were subjected to content analysis. Due to the large sample size in English, preference was given to the articles where the word-forms in question appear directly in the titles. If the number of such publications exceeded 50 per year, the first 50 in the combined search results for all

word forms in each language were considered. Similar content (more than 80 per cent similarity), translations of articles, as well as similar articles duplicated on different platforms were omitted. Since media information is more prone to the risk of losing relevance, only materials published between July 2021 and December 2022 were considered from this group. Thus, the total number of unique sources analysed was 237.

At subsequent stages, they were subjected to quantitative and qualitative analyses in order, respectively, to identify the most used word forms and to identify the main approaches to the interpretation of the term "impact investment".

Finally, using the methods of comparison, generalisation and interpretation, conclusions were formulated about the degree of homogeneity of the identified approaches at the level of definitions and terminological level.

APPROACHES TO DEFINING IMPACT INVESTING

The primary quantitative analysis of publication statistics showed that, although the volume of posted materials in Russian is much smaller than in English, the share of scientific papers (the share of publications in the Google Scholar system) in them is noticeably higher, and the number of studies in some cases even exceeds the number of references in mass media (*Table 1*).

Starting from 2017 in Russia, there has been a growing interest in the topic of impact investing, mainly stimulated by events (announcements of accelerators and conferences) and the publication of books on this topic. In 2020–2021, in particular, a significant segment of the media field was formed by reports on events that imply dialogue building (debates, online discussions) [2]. However, despite the willingness demonstrated by experts to share their experience and clarify controversial issues, at the moment the share of materials in Russian does not exceed 0.1% of the global volume of publications in English, and this is clearly insufficient to attract the attention of a wide range of investors.

There has also been a shift in the frequency of use of the terms "impact investment" and "transformative investment": in recent years, the former term has been favoured, while in the period up to 2020 the scientific community gravitated towards the latter. The positioning of impact investment both in the media and in research is based on the fact that it is a trend of the new economy ("new direction", "business strategy of the future", "new mechanism", "social revolution", etc.). [2]), which emphasises the relevance of efforts to define the content of this term.

The approaches to the interpretation of the concept of impact investment identified by the results of the subsequent qualitative analysis are presented in *Fig. 1*.

Most foreign authors distinguish them **as an independent concept and a separate investment class**. Thus, N. O'Donohoe, S. Leijonhufvud, E. Saltuk, and E. Bugg-Levine defined impact investments as "investments designed to create a positive impact in addition to financial returns" [2, p. 5]. As a consequence, *in addition to* the assessment and control of financial risks and profitability, they require the management of social and environmental indicators, and the effectiveness of their investment is assessed, among other things, by the achievement of targeted non-financial effects. At the same time, depending on the investor, one of these aspects may have a higher priority over the non-zero other, and the very combination of these motives encourages the business seeking investment to develop in a financially sustainable way, while contributing to the growth of the impact made [3].

N. O'Donohoe and co-authors introduce two distinctive characteristics of impact investment:

1) compared to socially responsible investments, which generally aim to minimise nega-

Table 1

Statistics of publications in English and Russian in Google and Google Scholar (GS) search engines*

Search term	Search engine	2022	2021	2019–2020	2017–2018	2015–2016	2007–2014
Impact investing (in ENG)	Google, thousand pieces	135	101	154	102,4	57,8	50,5
	GS, thousand pieces	2.9	2.9	5.1	3.5	3.1	4.8
	Share of GS, %	2%	3%	3%	3%	5%	10%
Impact investments (in ENG)	Google, thousand pieces	74.9	72.9	22.6	27.7	19.9	16.8
	GS, thousand pieces	2.2	2.2	3.7	3.1	2.4	3.2
	Share of GS, %	3%	3%	16%	11%	12%	19%
Impact investing (in RU)	Google, pieces.	93	85	137	102	8	3
	GS, pieces.	55	35	66	30	10	3
	Share of GS, %	59%	41%	48%	29%	125%	100%
Impact investments (in RU)	Google, pieces.	137	102	78	46	153	2
	GS, pieces.	39	27	48	22	14	4
	Share of GS, %	28%	26%	62%	48%	9%	200%
Transformative investing (in RU)	Google, pieces.	2	5	7	4	2	2
	GS, pieces.	7	6	24	14	18	0
	Share of GS, %	350%	120%	343%	350%	900%	0%
Transformative investments (in RU)	Google, pieces.	3	8	65	41	5	6
	GS, pieces.	13	21	60	38	22	5
	Share of GS, %	433%	263%	92%	93%	440%	83%

Source: compiled by the author.

Note: *The search results for the selected terms may overlap, as some articles mention several search terms at the same time. Search results may include original and translated identical articles, as well as publications of identical articles in different journals (on different platforms).

tive impacts, impact investments aim *to actively create* positive social or environmental benefits;

2) unlike investments that have unintended (accidental) social or environmental consequences, impact investments are made in a business that was *originally created* to achieve dual (financial and non-financial) benefits, which is directly reflected in its documented business strategy.

Later, E. Bugg-Levine in co-operation with D. Emerson deepened the above understanding of impact investment by introducing the term "blended value". The researchers noted that in a broad context any actions of capital owners on its investment and statutory activities of enterprises (and organisations) form a certain value, which includes economic, social, and environmental components that are in a state

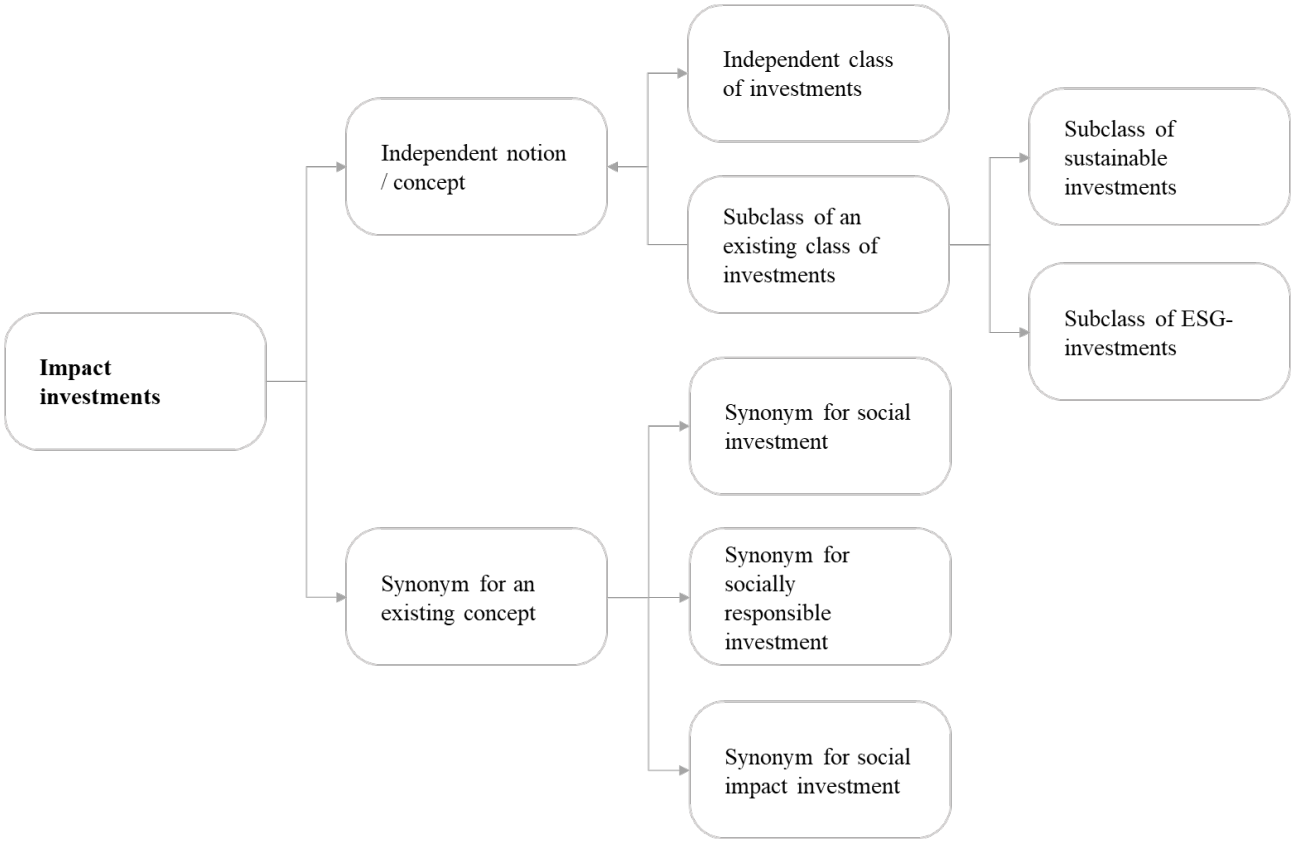

Fig. 1. **The most common approaches to defining the concept of impact investments**

Source: compiled by the author.

of indivisible unity. Traditional investment approaches perceive such value either in economic terms only (when it is created by commercial enterprises) or in social and environmental terms (when it is created by non-profit organisations or the State). However, impact investing is a very different way of acting, which results in the creation of what has come to be known as blended value — "it is a separate entity in its own right that must be understood, measured and aspired to. It is not the sum of its component parts, which can be obtained by simply adding up the totals of the three components… It is … the result of the recombination of basic elements which, through a process of natural integration, are transformed into a new, more powerful organisational and capital structure" [4, p. 27].

Developing this line of thought, K. Johnson and H. Lee [5] rightly pointed out the fact that, strictly speaking, all investments have social and environmental consequences, and on this basis, it is not obvious *what exactly* distinguishes impact investment from any other investment. Therefore, the researchers proposed to focus on investment intentions and defined impact investments as investments in organisations (including corporations, non-profit organisations, governmental bodies, etc.) due to the fact that these legal structures provide a market solution to overcome social or environmental problems of high importance for the investor. In other words, the choice of an impact investment object is determined primarily on the basis of the ability of candidate endeavours to mitigate or eliminate challenges, difficulties and contra-

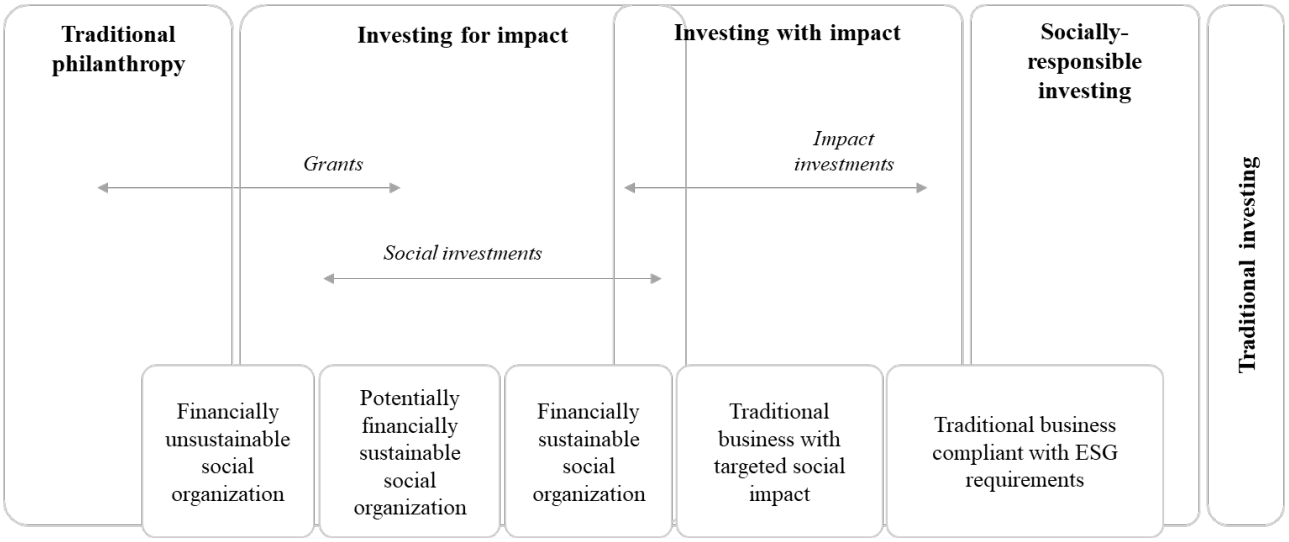

Fig. 2. **Spectrum of impact strategies according to A. Gianoncelli, G. Gagiotti et al.**

Source: compiled by the author based on [6].

dictions relevant to a particular capital owner.

A. Gianoncelli, G. Gagiotti, P. Boiardi and A. Picone Martinez [6], representing the position of the European Venture Philanthropy Association (EVPA), expand the range of investment strategies aimed, among other things, at obtaining public benefit, and additionally distinguish «investing **for** impact", and "investing **with** impact". Both of these classes are proposed to be placed between traditional philanthropy and socially responsible investments (*Fig. 2*), and impact investing should be referred to impact investing [with an intentional (targeted) social effect].

The approach to defining impact investment as a distinct investment class characterised by specific attributes and aimed at creating measurable positive social and environmental impact along with achieving financial returns was later confirmed in the official position of the US non-profit organisation Global Impact Investing Network (GIIN), a key organisation in the impact investment sector. Now it is the dominant concept of impact investing among experts and investors.

At the same time, among practitioners and consultants there are many who, sharing the opinion about the independence of the concept, nevertheless consider impact investments as a **subclass of sustainable investments**. In particular, proposing a new typology, T. Bush, P. Bruce-Clarke, J. Dervall and others put the latter at the head as the main umbrella concept [7] and distinguish them as part of impact-related investments, which, in turn, are subdivided into impact-aligned investments and impact-generating investments (*Table 2*).

The main differentiating aspect between the two is whether impact investments have demonstrable non-financial outcomes, the achievement of which can be directly attributed to the investments made (e.g., investments in technology upgrades have reduced atmospheric emissions by a targeted number of tonnes of greenhouse gases). At the same time, demonstration of comparatively improved, preferable results is sufficient to prove the materiality of impact-oriented investments (e.g., the level of greenhouse gas emissions from companies included in the relevant investment portfolio is below the industry benchmark).

By placing impact investments under the auspices of sustainable development and separating

Table 2

Impact-related investments (as part of sustainable investments)

Differentiation criterion	Impact-aligned investments	Impact-generating investments
The main strategic objective of the investment	Contributing to solving social and environmental problems and achieving the set social and environmental goals	Active participation in social and environmental change
Ways to confirm the materiality of the impact on the natural and social environment	Materiality is confirmed through a detailed ex post facto description of the results achieved against benchmarks or indicating the level of compliance with the SDGs	Materiality is confirmed by comparing target and actual indicators indicating the level of impact created
Basic approach to investment decision-making	The decision to invest is based on a predetermined set of exclusionary criteria (often in conjunction with a combination of other pre-investmenta and post-investmentb decision-making approaches)	The investor is guided by a full range of pre-investment and post-investment decision-making approaches in order to make an active contribution to social or environmental transformation
Documentation of investment results	The results achieved are described in detail and subject to external verification of the veracity of the facts claimed	The results achieved are described in detail and quantified according to predetermined investment objectives

Source: compiled by the author based on [7].

Note: a — Pre-investment decision-making approaches: (1) prohibiting the purchase of company securities for the portfolio due to business activities that are considered unethical, harmful to the public, or in violation of laws or regulations (exclusion); (2) selection of investments based on compliance with relevant international norms and standards (norms-based screening); (3) finding companies that are leaders in their sector in terms of meeting environmental, social and governance criteria (best-in-class); (4) incorporating material ESG information into the investment process to improve the long-term financial performance of portfolios (ESG integration); (5) thematic funds investing; b — Post-investment decision-making approaches: (1) voting; (2) engagement.

them from two other types of investments: those that are ESG-screened or ESG-managed investments, the authors hope that "the proposed typology will help mitigate criticism of impact-washing,[1] and give investors and beneficiaries a better understanding of what to expect from each type of investment" [7].

However, not all researchers agree with the separation of impact investing and ESG investing. According to the results of the study, it was noted that many practitioners similarly define impact investments, but categorise them **as part of ESG investment strategies**. For example, a study by the US-based Vanguard Group ESG — defined four ESG strategies, one of which is impact investing, understood as "targeted investments, often made in private equity or debt markets, with the twin goals of delivering measurable positive impacts on society and/or the environment and generating sufficient financial returns" [8].

Deloitte, an international advisory and auditing network, also defines impact investing

[1] Impact-washing — misleading stakeholders about the social and environmental effects being achieved.

as an investment "philosophy" through which ESG investing addresses social and environmental issues. The report, "ESG: Demystifying Impact Investing", notes in particular that the latter should not be seen as another asset class separate from the traditional world of investing, but rather as a methodology that also uses a social-environmental perspective lens [9].

The trend to **identify impact investing with other classes of investments** is dominant in Russia. D.V. Savrasova, noting that the phrase "impact investing does not have a clear translation yet (since this phenomenon has appeared relatively recently and there is no stable expression in Russian or other foreign languages at the moment" [10]), interprets it as an analogue of social investment. This point of view is shared by A.V. Krivko and M.A. Troshina, concluding that "in our country, this concept (i.e. impact investing) is mostly evaluated as "social investment" in the context of unified corporate social responsibility (CSR), since a significant share of CSR definitions is based on the concept of stable formation, taking into account financial, environmental and social impact on society. But impact investing is considered to be the most limited concept" [11].

Zh.S. Belyaeva and A.E. Kobzeva, by a set of criteria, including the purpose of investment, nature of investment behaviour, main types of recipients, etc., on the contrary, consistently divorce the concepts of impact investing and social entrepreneurship and conclude that the former is one of the tools for multidimensional assessment of CSR effects [12].

N.V. Kazakova and A.V. Slavnetskova support the separation of the concepts of impact investing and social investing, noting that "there are significant differences between them". The authors also challenge the applicability of translating the term as "transformative investment", as "it will allow too broad an interpretation of the content of this type of activity, since almost all investments in one form or another are aimed at transforming the object of investment and its environment, regardless of the spatial and temporal aspects of investment. Accordingly, this term does not fully reflect the specific features of impact investment associated with the modern period of technical and economic development" [13].

A.A. Golenkova and S.I. Shagbazyan identify impact investments with social impact investments [14]. S.E. Kalaturova [15] agrees with them.

O.A. Romanova considers impact investing as a current trend in the development of social responsibility of business [16]. The point of view of S.A. Silin and V.V. Pankratov is similar. [17].

Thus, a unified approach in Russian scientific practice has not been developed so far: the community tends to attach impact investing to the social sphere, which, in our view, narrows the scope of its application and generally contradicts the international approach and interpretation of the concept in question.

While the place of impact investing in the system of investment strategies is still a matter of debate, the qualifying characteristics of impact investing have already been clearly articulated. This set of elements has been defined by GIIN and is now considered globally recognised, although they are still not legally enshrined. **The attributes of impact investments**, according to GIIN, are as follows:

1) Intentionality: they must be carried out intentionally, with a precisely formulated and meaningful (for the investor and the world) purpose;

2) Investment with return expectations: impact investments should yield a financial return on capital or, at a minimum, a return on investment;

3) Range of return expectations and asset classes: Impact investment returns can range from below market rates to risk-adjusted returns, and such returns can be achieved across all asset classes (including, but not limited to, cash equivalents, fixed income, venture capital and private equity);

4) Impact measurement: Impact investors should seek to measure the concrete changes brought about by their investment and to verify the positive results at the societal, environmental, and business levels.[2]

Furthermore, based on the findings of the study, the author concludes that it would be appropriate to expand the list of the above-mentioned elements with the following additional key demarcation features:

- added value creation: Impact investors should select areas and objects of investment without which the achievement of the intended results could not take place, which in turn would make it impossible to have the intended impact;
- integration into strategy: Impact investing involves investing in projects that were originally set up to achieve dual — both financial and non-financial — benefits, which are directly reflected in their formally documented business plans.

The author also suggests supplementing the interpretation of the intentionality attribute by noting that not only the investor, but also the target enterprise itself, must demonstrate a sincere desire to engage in activities that directly contribute to the betterment and enhancement of the surrounding world.

The attributes of impact investments are, in fact, their fundamental properties that serve as inherent conditions for their existence and act as predicates. As such, they can be used to clearly define whether it is permissible to recognise a particular investment as an impact investment, as well as contribute to a clearer differentiation between different classes of investments focused on non-financial outcomes (such as sustainable investments, ESG investments, socially responsible investments, etc.).

IMPACT INVESTMENT MANAGEMENT

Impact investment management is a system of principles and methods for developing and implementing decisions related to the implementation of various aspects of impact investment activities at individual stages of the investment process.

Based on the previously identified definition and attributes, it can be assumed that this system implies a greater scope of responsibilities imposed on the investor and/or responsible asset manager, in particular at the pre- and post-investment stages, compared to traditional investments.

Thus, at the pre-investment stage, in addition to carrying out standard actions, impact investment management includes:

- extended strategic planning: establishing not only the rate of expected return, but also the specific social, environmental and economic objectives that the investor seeks to achieve;
- targeted impact assessment: identifying and documenting the intended social, environmental and/or economic impact of an investment, a description of which should include a list of measurable indicators and an assessment of potential risks and benefits.

The post-investment stage of impact investment management is also somewhat broader than that of traditional investments; the focus here is on the organisation of the control subsystem. In addition to the typical set of activities, it covers:

- combined risk management: analysing and controlling additional (to the main) in-

[2] Impact Investing. GIIN. 2023. URL: https://thegiin.org/impact-investing/ (accessed on 20.08.2023).

vestment risks related to social and environmental aspects of impact investments;

• measuring results and providing integrated reporting: regular tracking of indicators of achievement of social, environmental and economic objectives identified in impact investments;

• post-investment management: supporting the project or company at the local level, providing methodological assistance, facilitating effective interaction with various stakeholders seeking to achieve similar or interrelated objectives to ensure the effective impact of the investment on society and the environment, etc.

This expanded set of responsibilities for impact investors is implicitly supported by the Operating Principles for Impact Management (hereinafter referred to as the Principles) presented in spring 2019 by the International Finance Corporation (IFC).[3] They set out the steps necessary for effective impact management and are designed to support the development of the impact investing industry by establishing a common discipline for managing impact investments and the systems necessary to support them. According to the Principles, impact investing should:

• identify strategic impact objectives that are consistent with the investment strategy of the capital owner or intermediary fund;

• consider aggregate long-term impact at the level of the entire investment portfolio, while recognising that the level and nature of impact may be different for individual positions;

• compile and document a credible, evidential description of the contribution of impact investors or responsible managers to achieving the target impact for each impact investment;

• assess the expected impact of each impact investment through a systematic approach using indicators that, to the extent possible, are consistent with industry standards and follow best practices;

• assess, address, monitor and manage the potential negative impact of each impact investment;

• monitor the progress of each impact investment in achieving impact against expectations and respond accordingly;

• exit the impact investment, taking into account the impact of its timing, structure and the process itself on the sustainability of the targeted impact;

• analyse and document the results of each impact investment, compare expected and actual impacts and other positive and negative impacts, and use these findings to improve operational and strategic investment decisions as well as management processes;

• publicly disclose annually the extent to which the adopted impact management system complies with the Principles and regularly organise independent verification of this compliance.

As a result, the impact investor and/or responsible asset manager, if they are to be able to analyse the performance of the impact-investee company, its positive and negative externalities, and the progress made (as prescribed by the Principles, among others), must be close to the company and its management. Of course, there are still open questions about the feasibility and realism of such proximity, as well as the specific competences of impact investors and managers to ensure an effective balance between the return on investment and the social, environmental and economic outcomes achieved through its implementation.

However, this does not diminish the interest in developing and adapting unified impact investment management mechanisms. To

[3] Operating Principles for Impact Management. 2023. The 9 Principles. URL: https://www.impactprinciples.org/9-principles (accessed on 04.12.2023).

date, the number of signatory organisations to the Principles has almost tripled to 179, creating a global community of impact investors from 40 countries publicly demonstrating their commitment to implementing the IFC's global standard of performance.

CONCLUSIONS

The study shows that, at the level of definitions, the heterogeneity of approaches to understanding impact investment is generally less than might be expected. Almost all authors mention two key elements: financial return and non-financial impact. The former, i.e. return on invested capital, appears to be the expected minimum, and the level of potential returns can range from below market rate, to market rate or even above it. As for the non-financial impact, it is often spoken of as some kind of social and/or environmental impact that must be, firstly, intentional and, secondly, measurable and determinable.

We encounter deep contradictions at the terminological level: the approaches of different groups of researchers range from singling out impact investment as a separate and distinct category to fully identifying it with one or another existing class of investment. Such a wide range of definitions and unclear criteria for distinguishing similar concepts create risks in terms of academic and practical progress and credibility of impact investing.

Based on the content analysis, the author considers it reasonable to separate impact investments as an independent concept into a separate class (relating to long-term capital investments) and defines them as investments made with the aim of simultaneously achieving profit and creating positive social, environmental or other long-term qualitative non-financial changes in society or the environment. An extended list of attributes of impact investments, in the author's view, includes intentionality, payback, a specified range of expected returns and asset classes, measurable outcomes, value creation and integration into strategy.

The definition and attributes identified define the features of impact investment management, which include the need for enhanced strategic planning, target impact assessment, combined risk management, outcome measurement and integrated reporting and post-investment management.

In order to deepen the understanding of the nature and role of impact investment, it seems necessary to continue the discussion in professional and academic circles in the following directions:

- establishing the boundaries of differentiation between the impact investing segment and other similar classes of investments oriented to the public good (including sustainable investments, ESG investments, socially responsible investments, etc.);
- identifying internal constraints inherent in impact investing;
- developing methods for assessing the performance of impact investing;
- analysing factors contributing to the development of the impact investment market in the Russian Federation.

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Russian Logistics and Supply Chain Management: Challenges and Relevant Solutions

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ABSTRACT

Relevance of the research. The article considers a forced paradigm shift and systemic restructuring of Russian logistics due to the introduction of sanctions barriers and partial trade blockade, which, in addition to restricting Russian exports and imports, threatens digital technological transformations in supply chain management and occurs against the backdrop of tightening international environmental requirements for business activities, including logistics.

The purpose of the research is to review changes taking place in Russian logistics and to analyze corresponding solutions for supply chain management.

Design, methods, information base. The methodological framework of the research consists of fundamentals of logistics and supply chain management, elements of economic systems digital development concept and basic principles of ecological economics. The main research methods are collecting information from secondary sources, practicing experts in-depth interviewing, specialists surveying, computer content and PESTEL analysis. The methodological basis is formed by the basics of logistics and supply chain management, elements of the concept of digital development of economic systems and basic principles of ecological economy. The information base of the research consisted of interview transcripts, survey results, bibliographic documents, and Internet text files.

Findings. As a result of the work, external challenges and influencing factors are identified, internal processes, drivers and trends characteristic of Russian logistics and supply chain management today are identified and described. Relevant decisions made by Russian logisticians in the current period are systematized and evaluated. The flexibility and sustainability of supply chains was confirmed, as well as the high adaptability of Russian logistics to radical transformation of business environment and operating conditions.

Originality/value of the research. The study showed that despite the deglobalization of Russian logistics, it remains possible to manage any cargo delivery to Russia from anywhere in the world. The material may be useful both to Russian logistics practitioners and to persons studying or teaching the discipline "Logistics".

Keywords: supply chain management; logistics; international trade; domestic market; digitalization; ecology

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INTRODUCTION

Problem statement and relevance. Recovery from the COVID-19 pandemic was underway when the Russian economy faced new challenges due to the imposition of sanctions restrictions that deeply affected national imports and exports [1]. In this regard, Russian logisticians had to quickly adapt to the changed conditions: completely revise partner networks, establish other transport routes, master new customs regulations, and confront emerging risks and threats [2]. As a result, the transition to other route schemes and transport routes was carried out, domestic logistics operators were fundamentally restructured, new strategic solutions in the field of supply chain management (SCM) were worked out.

Such sudden and profound shifts have provoked an increased interest of the business community in the changes affecting Russian logistics and SCM. The aim of the study, which is to analyse solutions relevant to Russian logistics and supply chain management, can be achieved by implementing the following three tasks:

- identifying and analysing processes, drivers and trends important for the industry;
- identifying and analysing factors determining changes in Russian logistics and SCM;
- selecting and evaluating relevant solutions and adequate measures to adapt to new realities.

The object of the study is the supply chain management process carried out by Russian logistics operators. The subject of the study is the problem of the impact of sanctions restrictions, progress in digital technologies and environmental requirements on Russian logistics and SCM.

CURRENT INDICATORS AND TRENDS IN RUSSIAN LOGISTICS

The supply chain crisis triggered by the COVID-19 pandemic has been exacerbated by the geopolitical events of 2022–2023. Under the influence of sanctions, the volume and range of goods imported to Russia have decreased, while their cost in conditions of supply shortages is gradually increasing, and the purchasing power of Russian economic agents (households and companies) tends to decrease. As a consequence, sales are falling, which cannot but affect the scale of logistics activities, and as a result, the Russian market for this type of services is gradually shrinking in both B 2B and B 2C sectors.

The negative dynamics of the Russian currency exchange rate, the increase in the length of logistics routes, downtime at border crossings, and the reduction in the number of vehicles used in most directions have quite expectedly led to an increase in the cost of freight transport (*Fig. 1*).

1. ***An important trend is the reduction in rail, air, and pipeline freight traffic.*** Importers have mainly switched to road transport and containerised delivery by rail.

Cargo and freight turnover of railway transport. The growth of railway freight traffic in Russia in 2022 and 2023 did not fully compensate for its reduction due to the decrease in exports caused by sanctions restrictions. In 2022, compared to 2021, the decrease in its volume in our country amounted to 3.7%, and in 2023 this indicator remained virtually unchanged. However, since the length of routes has increased significantly due to the reorientation of cargo flows to the eastern direction, railway freight turnover in 2022–2023 remained essentially at the level of 2021 (*Fig. 2*).

In 2022 and 2023, the share of rail transport in Russian freight traffic decreased by 15.5%. Cargo traffic was redirected to the Far East, as well as along the North-South transport corridor to the ports of the Azov and Black Seas. The low capacity of railway lines in the Far East region hinders the return to the 2021 level.

This type of freight transport is more in demand than ever for the delivery of goods to Russia from China, which leads to in-

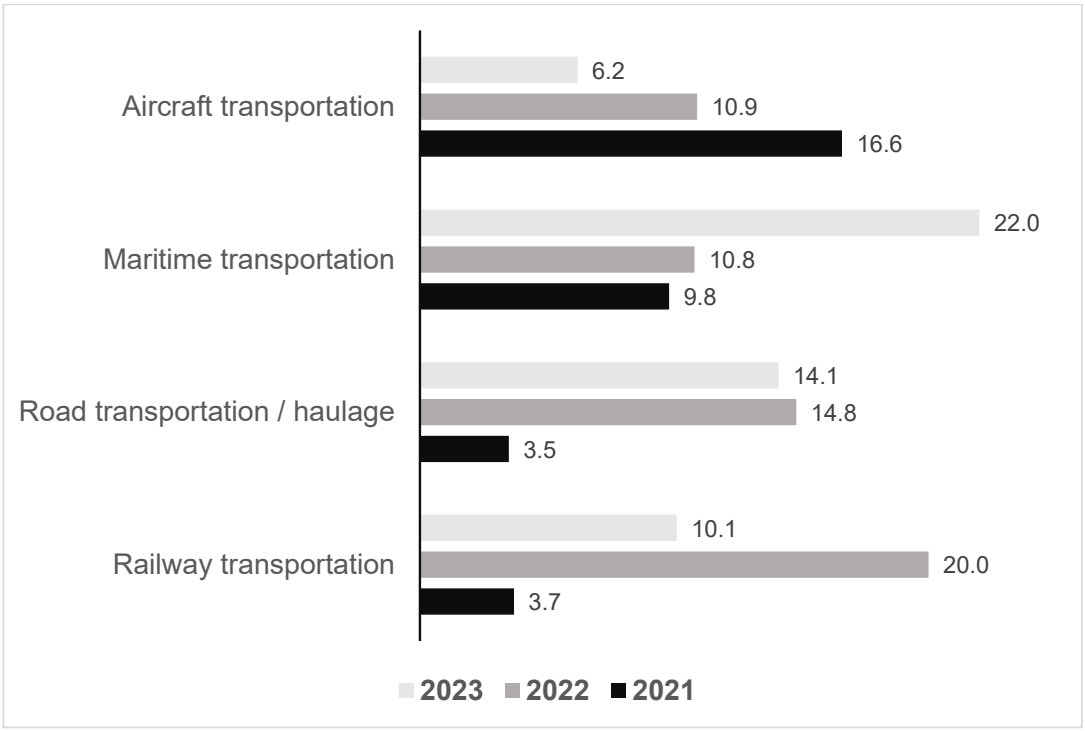

Fig. 1. **Growth of tariff indices for cargo transportation in Russian Federation in 2021–2023, % compared to the end of the previous year**

Source: developed by the author according to Rosstat data. URL: https://rosstat.gov.ru/statistics/price

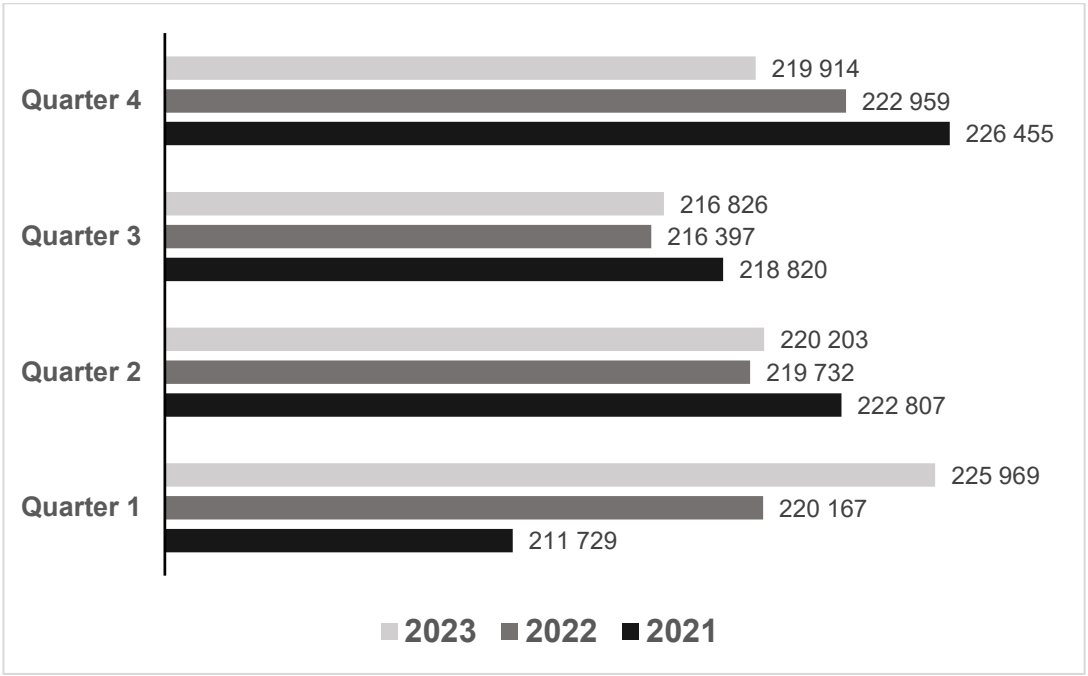

Fig. 2. **Dynamics of railway transport cargo turnover in Russian Federation in 2021–2023, million ton-km**

Source: developed by the author according to Rosstat data. URL: https://rosstat.gov.ru/statistics/transport

creased demand for rolling stock and empty equipment, as well as a shortage of space in goods trains travelling from China. Transit of cargo from China to Europe via Russia continues [3].

Cargo turnover of road transportation. Due to less infrastructure connectivity in our country, road transport dominates among other modes of freight transport — thus, in 2022 its share in freight transport in Russia will increase from 68.5% to 78.7%, and in 2023 it will decrease to 72.0%. Despite the reduction in imports due to sanctions, the volume of road freight transport grew by 11.3% the year before the previous one, and by another 0.6% last year (*Fig. 3*).

The entry of Russian freight vehicles into the EU territory is restricted, while European carriers are still allowed to import goods into Russia. As a result, trade links with Europe (via Poland, the Baltic States and Finland) are maintained, but the former intensity of cargo traffic in the north-west direction is out of the question. Delivery times from Europe have increased, freight and hire of rolling stock has become more complicated, logistical risks have increased, and their manageability has deteriorated [4].

Russian motor transport can freely enter the territory of China, but it is not possible to compete with container rail transport in terms of speed — the time of delivery from China to Moscow is 3–4 weeks, while a consolidated cargo takes even longer — up to 40 days. Another week can be spent waiting in queues for loading/reloading and for entry into China.

Cargo turnover of maritime transport. Russian maritime transport accounts for a small share of cargo delivered: in 2021, only 24.4 million tonnes, with the total volume of 8.1 billion tonnes. In 2022, maritime cargo turnover grew by 12.7%, and in 2023 — by 21.1%, which was due to an increase in freight traffic in coastal shipping/navigation. The main basins are the Baltic, Azov-Black Sea and Far East basins. One of the alternatives for sending Russian hydrocarbons to international markets could be the Northern Sea Route (from Sakhalin to Murmansk) [5]. The dynamics of cargo turnover of maritime

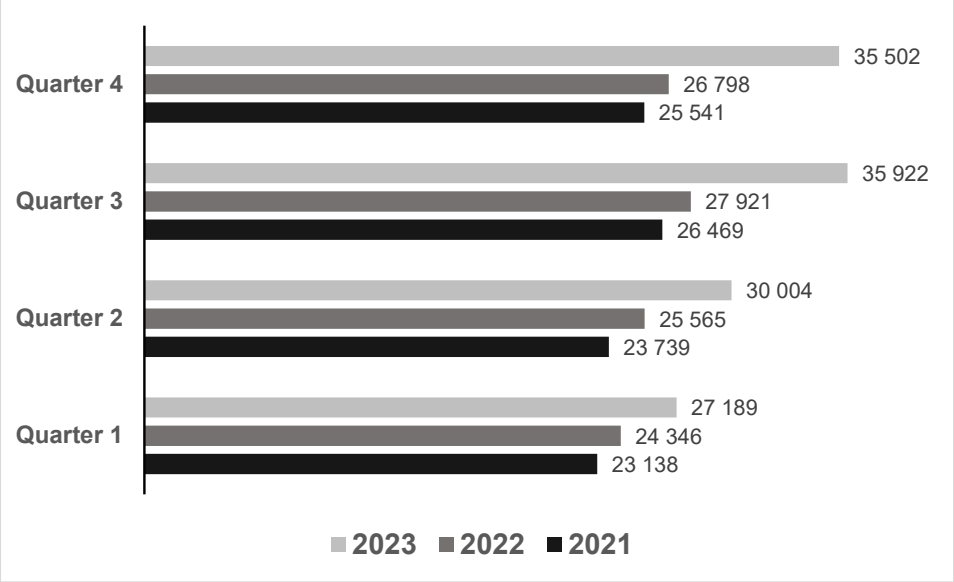

Fig. 3. **Dynamics of road transport cargo turnover in Russian Federation in 2021–2023, million ton-km**

Source: pdeveloped by the author according to Rosstat data. URL: https://rosstat.gov.ru/statistics/transport

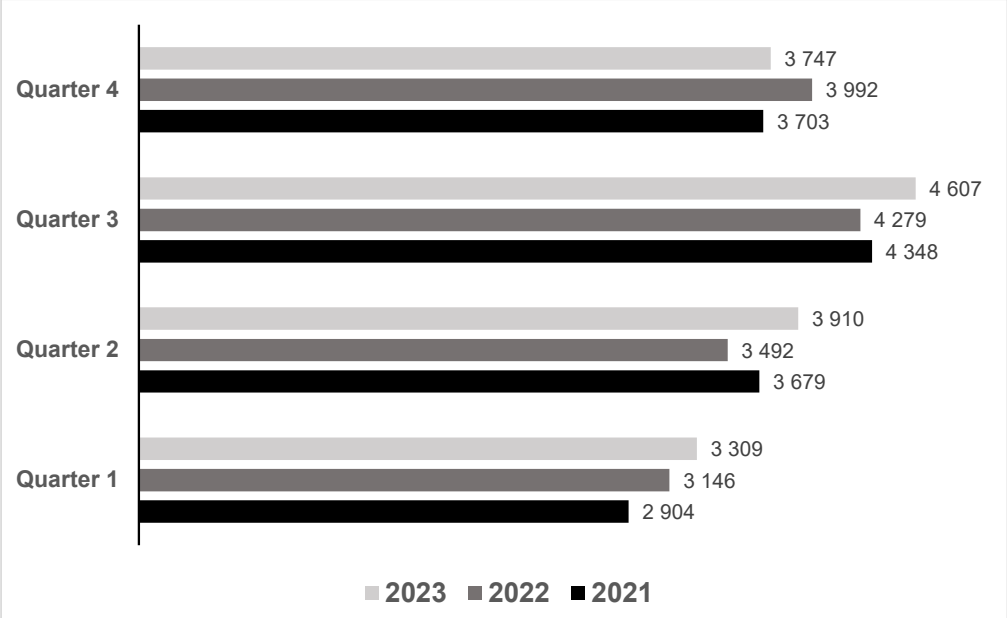

Fig. 4. **Dynamics of maritime transport cargo turnover in Russian Federation in 2021–2023, million ton-km**

Source: developed by the author according to Rosstat data. URL: https://rosstat.gov.ru/statistics/transport

transport in Russia in 2021–2023 is shown in *Fig. 4*.

Maritime transport provided about two-thirds of the transport of domestic imports and exports, so the boycott by foreign shipowners became very sensitive. Almost all giant shipping corporations refused Russian cargoes: A.P. Moller-Maersk Group (Maersk, Denmark), Mediterranean Shipping Company, MSC (MSC, Switzerland-Italy), Hapag-Lloyd (Hapag-Lloyd, Germany), CMA CGM Group (CMA CGM, France), Ocean Network Express (Ocean Network Express, Singapore-Japan), Yang Ming — YML (Yang Ming, Taiwan), which together account for about 80% of international container shipping [6]. Russian ships are banned from entering European ports.

However, there are still opportunities to transport cargo by sea — for example, cooperation with the Chinese company China COSCO Shipping (China Cosco Shipping), which carries out 13% of global container shipping, and the South Korean company Sinokor Merchant Marine (Sinokor Merchant Marine) with a wide geography of operations in South-East Asia, continues. In addition, more than 30 companies, including SITC Container Lines (Hong Kong), Hua Xin Container Lines (China) and others, carry out sea deliveries from Chinese ports to Vladivostok.

As for the leading domestic container sea carriers, their capacity is limited, but the development of foreign trade sea routes is still taking place. Ports on the Black Sea, the Pacific Ocean, the Sea of Okhotsk, and the Sea of Japan are functioning, and routes through Iranian ports and the Caspian Sea are being developed. Russian maritime transport infrastructure, including the harbours of Novorossiysk, the Leningrad Region, and the Big Port of St. Petersburg, has fallen under EU sanctions. Despite this, the sea gates are operating, accepting shipments from Turkey, Asia-Pacific, Middle East, Africa, Latin America, and others.

Aircraft transportation cargo turnover. The share of air transport in our country is very small — in 2021, it accounted for about 0.02% of the total volume of Russian freight traffic. And it is the aviation industry that has been hit

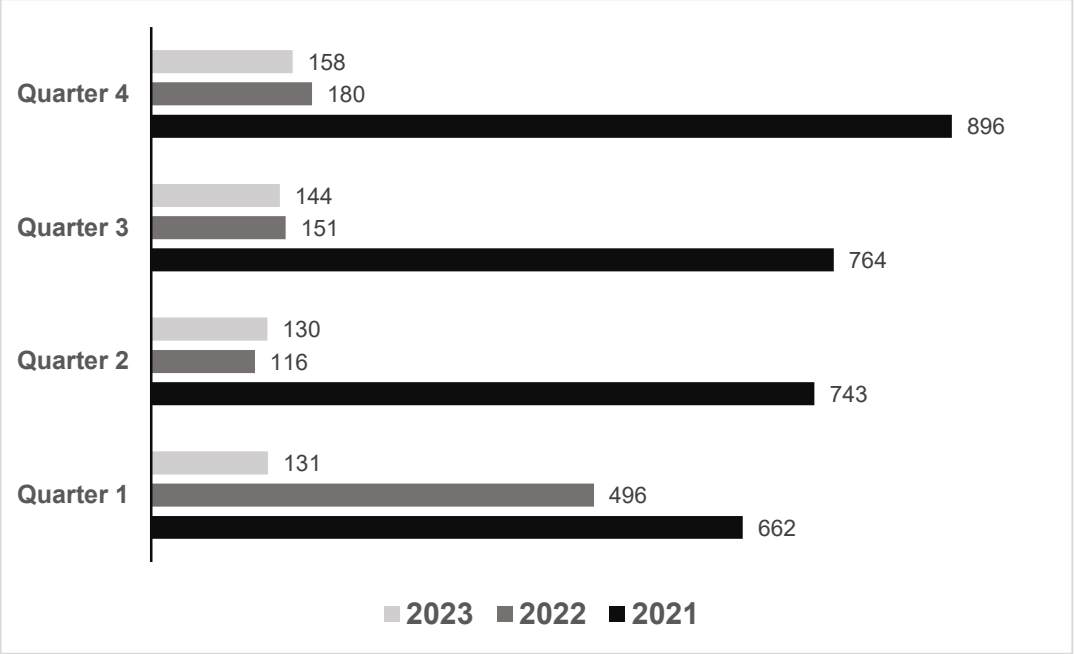

Fig. 5. **Dynamics of air transport cargo turnover in Russian Federation in 2021–2023, million ton-km**

Source: developed by the author according to Rosstat data. URL: https://rosstat.gov.ru/statistics/transport

hardest by the sanctions. European air routes were completely closed to Russia, as a result of which domestic air cargo traffic decreased by 62% in 2022 (from 1.48 to 0.56 million tonnes) and by another 17% in 2023 (to 0.47 million tonnes).

Logistics companies have reoriented to new air routes — for example, via Turkey, UAE, and China, or via Hong Kong and Korea; cargo is also sent by flights via Tajikistan, Armenia and Uzbekistan.

The dynamics of air cargo turnover in Russia in 2021–2023 is presented in *Fig. 5*.

2. *Exacerbation of infrastructural challenges,* including disruption of locomotive traction, shortage of wagons and containers, limited port and transhipment capacity, delays in loading and unloading, shortage of transport to move cargo out of ports, low capacity of border road crossings, as well as lack of transport capacity to ensure uninterrupted deliveries from East Asia, unpreparedness of Caspian and Far East infrastructure to divert and redirect logistics flows, inability of logistics staff to work in non-standard situations.

3. *Dominance in the Russian market of complex 3PL services* (storage, picking/kitting, delivery) as a consequence of:

- reorientation of the vector of domestic foreign trade from the western to the eastern direction, where multimodal logistics schemes mainly operate;
- two-way transport (i.e., with transhipment or transloading at the border), which implies complex services and involvement of several contractors;
- 3PL operators have more opportunities to circumvent international payment restrictions.

4. *Other trends* manifest themselves in several ways:

- *spread of e-commerce*, development of the Russian market for Internet order delivery, reorientation of Russian logisticians towards the domestic market due to the replacement of imported goods — that have disappeared or significantly increased in price — with domestic goods;

• *reduction of direct interaction* between manufacturers and customers in the course of logistics operations related to the movement of complex products subject to sanctions;

• *emergence of new players in the logistics services market* — in times of uncertainty, the chances of smaller companies finding their niche are increasing, as large corporations are not always ready for rapid restructuring and business paradigm changes, while newcomers are mobile and enthusiastic;

• *"containerisation" of shipments* — exports from Russia of non-ferrous metals, ore, grain and other products are now mostly containerised and routed through the Far East;

• *increased demand for consolidated cargo* due to the shift to smaller and more frequent orders due to the emergence of new small suppliers and lower customer demand;

• *high demand for door-to-door delivery*, difficulties in managing the movement of orders, growth in the number of distributors;

• *increase in the number of "fullfilment" operators* (offering a range of services at the "last mile"), i.e., expansion of related operations (customer interaction, assembly, packaging and dispatch of parcels, delivery control, etc.), the performance of which is increasingly outsourced;

• *deterioration of the ability to strategically plan* foreign trade logistics operations and manage international supply chains.

DESIGN, METHODS, INFORMATION BASE OF THE STUDY

The sequence and content of the research stages are presented in *Fig. 6*.

1. An information base was formed based on the results of the desk research, which was based on a combination of such approaches as

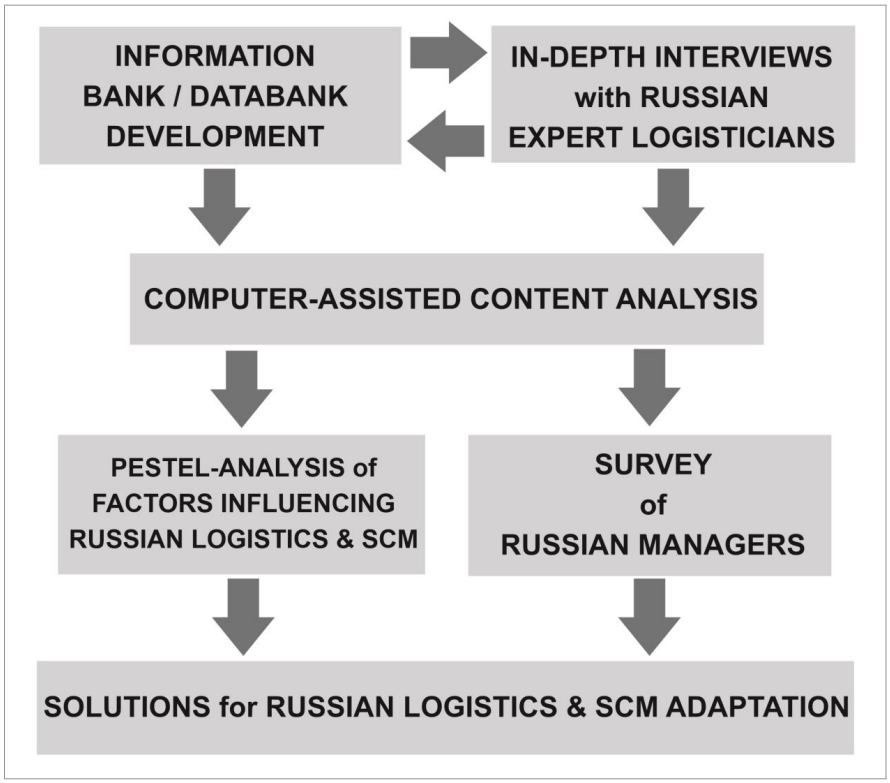

Fig. 6. **Research design**

Source: developed by the author.

computer content analysis, classification and description, induction, deduction, generalisation, analogy, observation, and comparison. It included scientific articles and proceedings of scientific and practical conferences, online publications containing opinions of experts and posts of practicing professionals in social networks, as well as Internet media files, materials of expert sessions and consulting reports in the following thematic areas:

- analytics — on trends and prospects of Russian foreign economic and logistics practices;
- national logistics industry under the influence of anti-Russian sanctions, attempts of logistic blockade and isolation of Russia;
- status quo of Russian logistics and SCM, measures to maintain Russia's foreign economic relations (restructuring of logistics networks, search for partners, development of new freight routes and transport schemes);
- innovative contexts of Russian logistics and SCM, digital development of domestic logistics operators, digitalisation of supply chain management in Russia;
- the concept of "ecologistics" or environmental logistics, minimising the environmental impact of logistics activities.

The selection criteria for the above materials are keyword compliance, relevance (publication in 2022 and 2023), credibility and reliability (significant experience in logistics and SCM, and good expert reputation of their authors).

2. Based on the findings obtained:

- a script of in-depth interviews with experts was developed and a guide or a roadmap for the upcoming conversation was prepared, which outlines the general framework, main logical blocks and key issues to be discussed;
- in 2023, a series of interviews with practitioners, including SCM directors and heads of logistics departments and projects with more than 10 years of professional experience was organised (*Table*).

3. With the help of MAXQDA[1] software, which does not require a user licence in the short term,[2] computer structuring and content analysis of interview notes, selected bibliographic documents and Internet text files was carried out, which provided material for PESTEL analysis of the factors determining the Russian logistics and allowed to form a set of actual solutions for SCM.

4. A PESTEL analysis was performed, with political, economic, technological, and social aspects at its centre, complemented by environmental and legal components, which allowed us to consider external influences on Russian logistics and SCM.

5. In January 2024, a survey of executives and managers of Russian companies involved in the organisation of production procurement and supply was conducted. In particular, the respondents were asked to assess the relevance of SCM solutions selected at the previous stages of the survey on a 10-point scale. All 120 respondents are students or graduates of further education and MBA programmes.[3]

FACTORS INFLUENCING RUSSIAN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

The operating conditions of Russian logistics and SCM are conditioned by six groups of factors, which are assessed below in the PESTEL analysis.

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[1] Kuckartz U., Rädiker S. Analyzing qualitative data with MAXQDA. Cham: Springer International Publishing. 2019;290. URL: https://link.springer.com/content/pdf/10.1007/978–3–030–15671–8.pdf

[2] MAXQDA — Software for qualitative data analysis. Official site. URL: https://www.maxqda.com/ru

[3] The margin of error was estimated as $\sqrt{Z^2 P (1-P) / n}$ 100%, where n — is the sample size (n = 120); Z — is the normalised deviation (at 95% confidence level Z = 1,96); P — is the variation for the sample. In the worst-case scenario (when P = 50%) the margin of error will be less than 9%, which is quite acceptable for this study.

Table

Profiles of interviewed experts

No.	Position in the organization	Area of activity	Topic of conversation
1	Head of the import and certification group at Schneider Group consulting company	Services for building the entire logistics chain along the flow of goods: from finding partners and suppliers to solving delivery and customs clearance issues	Integrated international logistics
2	Project manager in the field of foreign trade logistics	Projects for the supply of food raw materials, high-tech equipment, automation, and organisation of warehouse operations in China	International Supply Chain Management
3	Director for Business Process Optimisation, Head of the Project Office of "Russian Cheese" Group of Companies	Management of the company's logistics division, including automation of logistics processes. Development of technical tasks for IT-specialists, support of implementation	Procurement, warehousing, transport logistics
4	Director for SCM of "Specta" Group of Companies	SCM in retail, pulp and paper, metallurgy, and metal processing companies	Transport logistics
5	Chief Operating Officer of "Grene Kramp" Company	Management of foreign procurement and sales in Russia	All logistics in one process
6	Chief Operating Officer of "Makita" Company (Russia / CIS)	Transport logistics (rail, sea, road, air), warehouse logistics, planning, foreign trade, digital transformation of the organisation	Supply chain sustainability

Source: developed by the author.

The political environment — foreign policy crisis, exchange of sanctions between unfriendly states and Russia, threat of taking measures against countries — potential partners and "bridges" that allow Russia to circumvent sanctions restrictions, became the main source of negative impact on the domestic economy, shrinking the market of Russian logistics services, complicating supply chains, increasing the length, timing and cost of freight traffic [7, 8].

Economic conditions. Restrictions on the work of domestic companies in foreign markets, denial of foreign lending and investments in Russian projects, partial freezing of Russian assets abroad, destruction of international economic alliances and partnerships, slowdown of interbank transactions and foreign economic activity — all this undermines the national economy, reduces demand for logistics services and makes it difficult to do business in this area [9, 10].

Social circumstances are unfavourable, which complicates the implementation of logistics activities in Russia, namely:

- almost complete technological dependence on the participation of the human factor and manual labour in most logistics operations and works, such as loading/unloading, warehousing, storage, picking, delivery;
- inexpediency of launching digital projects (robotisation, replacing people with automatons, etc.) that reduce the employment of workers in logistics and SCM, in anticipation of the expected reduction of the labour market in Russia [11];
- use of sophisticated fraudulent schemes and methods of dishonest enrichment (including theft of goods during transport and storage in warehouses), instigated by falling incomes of the population.

Technological constraints and opportunities. The limit of the Russians' access to Western know-how, the ban on the supply of equipment, components, spare parts, consumables to Russia, the import substitution of which will take years — all this has a negative impact on economic activity in the country, including its logistics sector [12]. In addition, due to the embargo on the supply of equipment and technologies to Russia, the course of digital development of logistics companies is jeopardised, as all the necessary element base (GPS-trackers, RFID-sensors and many others) is imported [13].

The environmental situation is characterised by a high dependence of Russian logistics on fossil fuels and energy-intensive technologies against the background of the adoption of the European programme of decarbonisation of the economy and the tightening of international environmental safety requirements for production and other activities, including logistics activities [14].

The legal aspect covers a wide range of issues.

1. State aid to the Russian logistics industry regulated by resolutions of the Russian Government:
   - additional capitalisation of Russian Railways, for which RUB 485 billion has been allocated from Russia's National Wealth Fund[4];
   - compensation to Russian international carriers and road transport companies that have had their rolling stock and/or cargo confiscated in the territory of the sanctioned countries in the amount of RUB 1.6 billion[5];
   - financing of the federal project "Development of Sea Ports", for which RUR 2.8 billion has been budgeted in 2024[6];
   - support for air transportation.[7]
2. Increased complexity of contractual relations with foreign element — due to sanctions regimes of unfriendly countries and increased attention from foreign regulatory authorities, counterparties have difficulties in fulfilling foreign trade obligations [15].
3. Unwillingness of litigation between parties (especially from different jurisdictions) in a sanctions environment (in particular due to the difficulty of engaging foreign counsel and the risks of refusal to recognise and enforce judgments in an unfriendly country) [16].
4. Fixing the definitions of electronic documents[8] (consignment note, accompanying list,

[4] Resolution of the Government of the Russian Federation No. 602 dated 06.04.2022 "On the Acquisition of Preferred Registered Shares of Open Joint Stock Company Russian Railways at the Expense of the National Welfare Fund". URL: http://government.ru/docs/all/140239/

[5] Order of the Government of the Russian Federation No. 2955-o dated 08.10.2022. URL: http://government.ru/news/46782/

[6] Maritime News of Russia. URL: https://morvesti.ru/analitika/1688/106558/

[7] Resolution of the Government of the Russian Federation No. 1015 dated 02.06.2022 "On the acquisition of bonds of Russian airlines at the expense of the National Welfare Fund". URL: http://publication.pravo.gov.ru/document/0001202206030005

[8] Resolution of the Government of the Russian Federation No. 2200 dated 21.12.2022 "On Approval of the Rules for Carriage of Goods by Road Transport and on Amendments to Clause 2.1.1 of the Road Traffic Rules of the Russian Federation". URL: http://publication.pravo.gov.ru/Document/View/0001202012230048

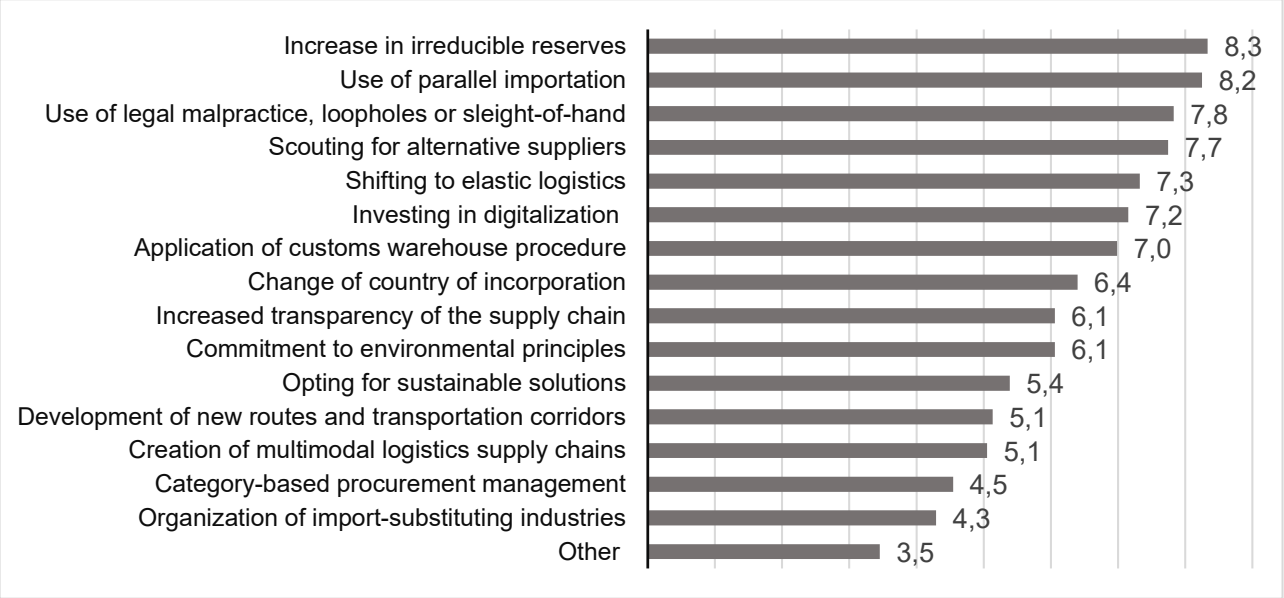

Fig. 7. **Ranking of current solutions in Russian logistics and supply chain management, weight %**

Source: developed by the author.

purchase order, etc.), which are important for the transition of Russian logistics to electronic document management (which is hampered by the lack of state standardisation and the absence of digital signatures in most domestic contractors).

All the factors discussed above are external to the domestic logistics industry. Their influence largely determines the current trends in Russian logistics practices.

RELEVANT RUSSIAN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

The assessment of the relevance of solutions for adapting Russian logistics and SCM to the current situation, based on the results of the survey of Russian companies' employees, is presented in *Fig. 7*.

Commentary on the content and specific application of each solution is provided below.

Revision of stock standards for key items of the assortment and materials, creation of insurance stocks for scarce components, refusal to use components that cannot be quickly replaced without affecting the properties and quality of products — all this contributes to ensuring uninterrupted operation of production enterprises.

The expansion of parallel imports[9] allowed domestic enterprises to establish new supply chains for goods that are not produced in the country. Now European and North American imports go to Russia through offshore (UAE, Hong Kong, etc.). The chain continues to improve, which helps to reduce the cost of delivery.

The use of defensive mechanisms and legal "tricks"/ loopholes in contracts and agreements, namely:

- to provide for the right to unilateral refusal to fulfill the contract in case of introduction of sanctions prohibitions concerning one of the parties;
- refer sanctions restrictions to force ma-

[9] Federal Law No. 213-FL of 28.06.2022 "On Amending Article 18 of the Federal Law "On Amending Certain Legislative Acts of the Russian Federation". 2022. URL: http://pravo.gov.ru/novye-postupleniya/federalnyy-zakon-ot-28–06–2022–213-fz-o-vnesenii-izmeneniya-v-statyu-18-federalnogo-zakona-o-vneseni/?sphrase_id=7994

jeure circumstances (contingency);

- limit the exchange rate difference when specifying the price in a foreign currency [designate a permissible currency corridor, peg to a "safe" currency (yuan) or the value of gold];
- avoid litigation, minimizing the risks and consequences of non-fulfillment of contractual obligations due to the problematic realization of the right to objective judicial protection in unfriendly countries.

Transition to elastic logistics and flexible supply chain management, which means the intention to make logistics processes more malleable and operations more sustainable in order to ultimately ensure route optimization, reduce overstocking, improve price control and increase the efficiency of logistics activities. The realization of this direction depends to a large extent on the level of digital development of companies in the industry.

Investing in the digitalization of logistics and SCM, implementing automated systems and mastering robotic technologies designed to improve the efficiency of warehousing, service, transportation and other logistics services are all measures of digital development of logistics operators and robotization of logistics procedures.

The digital development of logistics operators is determined by the mastering of a number of innovative technologies, namely:

- *the Internet of Things,* which facilitates optimal management of vehicle movements and warehouse inventories*;*
- *cloud computing* to centralize all logistics and SCM optimization analytics;
- *artificial intelligence and machine learning* to detect potential problems with logistics and SCM and suggest solutions;
- *barcoding,* an indispensable tool for tracking the movement of goods along the entire logistics chain;
- *blockchain,* which serves as a transaction ledger and safeguards sensitive data.

Implementation of all these technologies, which are in full demand in modern logistics, requires the use of appropriate electronic components, free access to which is currently limited due to the embargo on the import of microelectronics to Russia.

Robotic automation of logistics procedures today is limited to the participation of autonomous mobile vehicles in loading and unloading operations and the use of unmanned vehicles to move goods within warehouses.[10] More and more logistics operators are using computer analytics and machine vision algorithms to reduce order processing time and speed up delivery, as well as to reduce the need for human intervention and minimize the likelihood of errors.

Application of the customs warehouse procedure, the essence of which is that a carrier from Europe delivers cargo to the temporary storage warehouse closest to the border with Russia, and Russian transport picks it up and delivers it to the customer.

Change of "nationality". Since domestic vehicles are not allowed to enter the EU, some international logistics companies headquartered in Russia have re-registered, formally becoming foreign companies that are not prohibited from traveling to Europe.

Increased transparency of supply chains will make it possible to better track cargo on its way from supplier to customer.

Adherence to the principles of green logistics implies consistent implementation of a set of measures to reduce environmental pollution and carbon footprint. Modern business follows environmental rules primarily for image reasons — all customers today want the product to be environmentally friendly, and its production and delivery to be "green". Since logistics is concerned with optimizing freight traffic and

[10] The use of drones and quadrocopters, which could be considered last-mile delivery vehicles, is prohibited by Russian law.

increasing the efficiency of transportation systems (which also has an impact on reducing harmful emissions into the environment), its area of responsibility is largely identified with ensuring environmental safety in general. Hence the concept of "green logistics", which implies the guarantee of not only "clean" production and delivery of products, but also their return for disposal after consumption, as well as the realization of a closed cycle: production, distribution, consumption, disposal and recycling — due to environmental considerations.

Choosing sustainable solutions. Shifting priorities from least-cost business schemes and strategies to the most robust and flexible ones, focused on ensuring the supply chain's ability to continue to function reliably under the influence of unpredictable external influences, adapt easily and smoothly to changing conditions, and respond quickly and effectively to emerging risks.

Development of new international transportation corridors. The main logistical means of mitigating sanctions restrictions was the organization of cargo transport flows to Russia via third countries:

1) *Turkey*, which has now become the main hub for import supplies to our country. Russian airlines Aeroflot, Red Wings, Ikar, and S 7 fly to Istanbul on several flights a day. There are also two options for traveling to Russia from Turkey by road: via Georgia or Iran and Azerbaijan [17]. Since the Upper and Lower Lars crossing points are overloaded and not always accessible due to weather conditions, the main cargo traffic goes through the second route, which takes about 20 days. In addition, it is possible to deliver by ferry from Turkey to the ports of Krasnodar Region;

2) *from China* to ports in the Far East and then by rail to the European part of Russia (cargo delivery time to Moscow via Vladivostok averages 40–45 days). Cargo from China can also arrive at the ports of Novorossiysk and North-Western Sea harbors. Direct flights from China to Russia are operated by Aeroflot, Volga-Dnepr, Air China, Hainan Airlines, and Sichuan Airlines;

3) *to India, Iran, the Middle East, North Africa*, which are connected with Russia by the transport corridor "North-South", combining sea, rail and road routes with a total length of more than 7 thousand km and including three routes: through Azerbaijan, Kazakhstan and Turkmenistan, the Caspian Sea [18, 19]. In all three directions there is a steady growth of traffic, limited by infrastructural capacity, for the expansion of which it is necessary to modernize the port of Astrakhan, railway and port terminals in Iran, as well as border crossing points and highways in Azerbaijan, Dagestan and Kalmykia.

Reorientation of Russian exports to southern and eastern directions. For example, Russia's leading metallurgical companies (EVRAZ LLC, Mechel PJSC, Severstal PJSC, DiPOS Group of Companies), which previously exported to EU countries, are now supplying to Asia, the Middle East and North Africa. The Russian oil and gas industry has also reoriented itself and is developing logistics infrastructure in Eastern countries, which will significantly increase the latter's import potential.

The development of the Northern Sea Route as an alternative route for cargo delivery to Russia and oil and gas exports is limited by the short navigation period, the difficulty of ice navigation and the lack of regular voyages [20]. In addition, Russia currently has insufficient tanker capacity, and maritime transportation cannot develop due to the ban on insurance of Russian ships.

Transformation of logistics chains towards a multimodal structure implies a combination of sea, rail and road transportation. For example, indirect cargo delivery is practiced, based on a combination of road and air transport: by plane, as close as possible to the Russian border, followed by transloading onto a car. And vice versa. For example, from

China — by road to Khabarovsk or Vladivostok, and from there by airplane to Moscow. Such a connecting flight lasts 7–10 days, and the cost reduction compared to direct delivery from China is 15–20%

Category-based procurement management[11] is used as a way to improve supply efficiency and reduce costs for the company.

Organisation of domestic production and import substitution reduces supply chains.

Other solutions [21–25]:

- *digital transformation and automation of the supply chain process* to improve demand planning, increase supplier efficiency and reduce costs;
- *change of inventory management strategy* — creating Just in Case inventories instead of Just in Time replenishment;
- *uberisation* — joint use of resources of supply chain participants based on standardisation of nomenclature data and integration of system solutions;
- *attracting European carriers*, which is complicated by the fact that not all of them are ready to make flights to Russia, as cargo is often delayed at the border and there is a high probability that it will not be certified;
- *development of alternative sources of supply*, access to new vendors and distributors;
- *improving control over the movement of vehicles transporting cargo*;
- *introduction of a proactive approach to risk management*,— which is based on the forecasting by procurement managers and supply specialists of possible scenarios of market situation development;
- *renewal of vehicle fleets* with Russian and Chinese heavy-duty trucks (FAW, DongFeng) and gradual abandonment of Western-made trucks (Man, Mercedes, Scania), which have become difficult to maintain;
- *shipping containers in gondola (open railroad freight car) cars* (instead of fitting platforms), which was launched and is being developed by Russian Railways Holding Company;
- *development of "cold" logistics* — improvement of measures to ensure the necessary temperature and other conditions for preserving product conditions on the way from the producer to the consumer;
- *adherence to ESG principles* in designing transport and warehousing chains.

[11] Consolidation of the disparate needs of the company's business units into a single global contract.

CONCLUSIONS

Joint analysis of the information base, expert opinions, and the results of the survey of specialists allowed us to see the key transformations in Russian logistics and Supply Chain Management in 2022–2023, identify the main trends and select relevant solutions.

Three defining aspects were identified: changes in international trade and domestic market dynamics; digitalisation, process automation, new software, electronic systems, and equipment; and the environmental factor. The results of analysing the complex influence of these aspects constitute the scientific novelty of the study.

The theoretical contribution is the discovery that deglobalisation has become a new reality for Russian logistics practices. Nevertheless, it is still feasible to organise cargo delivery to our country today, from anywhere in the world, but using bypass routes, which, of course, affects timing, risks, and price.

The applied significance of the research lies in identifying the main drivers, trends, and vectors of restructuring of Russian logistics as of 2023. It is also practically important to assess the main trends, identify risks and opportunities, consider, and analyse strategic decisions in the field of domestic logistics and Supply Chain Management.

It is shown that current trends are transform-

ing this industry (or sector) towards greater flexibility and better adaptability to changing conditions.

It was confirmed that the creation and development of new logistics schemes, despite the high time and labour costs, turned out to be quite feasible — Russian specialists succeeded in reorienting supply chains and redirecting commodity flows. At the same time, many logistics systems and supply schemes are built from scratch and "finalised" as they are being used.

Limitations of applicability of the results. Any of the factors influencing Russian logistics and Supply Chain Management may change, and earlier conclusions may require revision. In addition, the estimates obtained may not be sufficiently universal, as they are based on the opinions of a narrow group of experts and a limited sample of respondents. In this regard, it is necessary continue to monitor the Russian logistics services market, work closely with experts in this area and Russian business practices to make timely changes in logistics solutions and adjust Supply Chain Management.

Continued research primarily involves tracking processes and events important to Russian logistics and Supply Chain Management, including:

- political and economic dynamics that have a direct impact on trends, work and decisions in the sphere of Russian logistics and Supply Chain Management;
- development of new transport corridors and logistics routes, development of the country's transport and logistics infrastructure;
- creation of specialised software products and services;
- new opportunities offered by digitalisation of business processes and artificial intelligence;
- stricter environmental principles and requirements.

In addition, it is important to study the impact of current events and challenges on international logistics and global supply chains.

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Innovative Design of Marketing Ecosystems

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ABSTRACT

This study is devoted to the issues of ecosystems and the ecosystem approach. The formation and use of marketing ecosystems can simplify both the processes of transformation of technological patterns and the interaction of different types of business models of enterprises. A separate focus is on marketing ecosystems as one of the important innovations of Industry 5.0. The transition from Industry 4.0 to Industry 5.0 is accompanied by the creation of the necessary software and algorithmic base of quantum computing, introduction of technologies for visualisation of management decisions, development of neuromorphic models of enterprise architecture, digital twins of business processes.

The **purpose** of the study is to develop approaches to designing a marketing ecosystem within the framework of Industry 5.0 and Industry 4.0, which is necessary for building effective interactions between innovative enterprises of different business spheres. The article considers the stages of innovative design of new marketing ecosystems, the result of which is the end-to-end integration of information resources of their member enterprises, which is necessary for the consolidation and synchronisation of structured and unstructured data on different business models of companies and the organisation of predictive analytics mechanisms. In the course of the work, the **method** of scientific analysis of literature on the research problem was applied, and the empirical experience of the authors of the article was used. The **results** of the study will be useful to all managers of innovative companies as well as the heads and employees of marketing departments of these companies.

Keywords: marketing ecosystem; Industry 4.0; Industry 5.0; business processes; marketing research; innovative design; end-to-end integration of information resources

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INTRODUCTION

Marketing Ecosystem in the Transition from Industry 4.0 to Industry 5.0

Industry 4.0 uses a new approach to production, which is based on the active application of IT tools in industrial activities and involves full-scale automation of business processes. A feature of Industry 5.0 is artificial intelligence (AI) technologies used for predictive analytics and end-to-end data integration [1].

The goals of implementing the Industry 4.0 concept are:

1. Higher productivity of innovation activity results.
2. Reduction of workplaces under hazardous and harmful labour conditions.
3. Increased competitiveness of the enterprise.
4. Emergence of qualitatively new products - innovations.

According to [2] the properties of Industry 4.0 are:

- the use of big data in the organisation's work;
- the possibility of a virtual overview of the process of production of goods or provision of services;
- combination of virtual and real environments;
- cloud computing;
- cyber security;
- modelling.

In [3] it is emphasised that as the use of intelligent systems increases, the efficiency of the enterprise as a whole increases. By utilising software, a company can produce higher quality products. Through innovation and other changes, Industry 4.0 will increase the share of high value-added products, leading to faster economic growth and increased competitiveness of organisations.

The following elements form the basis of the Industry 5.0 concept, according to the authors [4]:

a. an intellectual core based on artificial superintelligence;

b. a four-component tetrad of ecosystems;

c. a complex of ecosystems, including the central ecosystems — socio-economic and neurodigital ones.

The authors [5] point out the link between the concepts of Industry 4.0 and Industry 5.0, but argue that one is not a direct continuation of the other. They should be considered together, i.e., as a coexistence of Industry 4.0 and Industry 5.0 oriented towards social values. According to these scholars, a "techno-social revolution with technology as the tools and social needs as the ultimate goal" is underway, which further proves the importance of the social human factor within the framework of Industry 5.0.

The article [6] provides a classification of business model types (integrative, service, consulting), which is the most complete. The authors describe these models from the point of view of Industry 4.0, provide an algorithm for choosing the right one among them, and also suggest considering their characteristics from the point of view of Industry 5.0 (*Table 1*).

An interesting approach to defining company behaviours within the Industry 5.0 framework is demonstrated by the researchers in [7]:

1. "Transform or perish": the business model consists of investing significant resources in high technology in order to increase overall business efficiency.
2. "Transform to win": the business model is to seek greener solutions. Transformation is not full-scale — most likely a new development track is added.
3. "Transform to develop": the business model is based on an ecosystem approach that develops technologies, procedures, business processes that are available to ecosystem participants.

Along with the achievement of environmental, social, and economic goals, the ideas of technological development, high-tech imple-

Table 1

Characteristics of business models from the point of view of Industry 5.0

No.	Model name	Industry 4.0 business model	Industry 5.0 business model
Integration of the value chain participants			
1	Crowdsourcing	The trusted data access model	A model of the influence of society on the achievement of production results. The model emphasises the role of the individual not only as a source of knowledge, but also as a subject of decision-making regarding the financing of certain activities. The role of society in the final activity of the company increases significantly
2	Production as a service	Services model in the value chain	Consumer-producer model. Within the framework of the model, a person is defined not only as a consumer of products, but also as a direct participant of its development
3	Customisation of production	Services model in the value chain	The model of intellectual adaptation. Within the framework of the model, products are adapted to the specific needs of certain categories of customers, often the smallest ones
Customer service for products and services			
4	Solution Support	Internet of Things Platform Model	Decision Automation Model. The model assigns a special role in decision-making to AI and big data analyses
5	Product as a service	Internet of Things Platform Model	The model of intellectual sharing The model involves the creation of more and more new products that people use by applying sharing technologies. The model is implemented based on analysing the demand for sharing products through big data analysis
6	Process as a service	Internet of Things Platform Model	Intelligent Processing Model. The model provides easy consumer access to various processes based on AI and big data analysis. Customised services are being replaced by mass services
Data-driven consultancy			
7	Consultancy on product operation and exploitation	Trusted Data Access Model	Ecosystem consulting model. The model creates a common knowledge base of companies within the same ecosystem
8	Consultancy on process organisation	Trusted Data Access Model	Ecosystem consulting model. The model creates a common knowledge base of companies within the same ecosystem
9	Mediation services	Trading platform model	Ecosystem trading model. The model creates an intelligent internal trading platform for goods and services within an ecosystem of companies. Its advantages lie in the exclusivity of access to it and in the formation of demand and supply in automatic mode using AI methods
10	Process efficiency analysis	Trusted data access model	Ecosystem business process model. The model consolidates business processes of companies within one ecosystem. Common AI-based business process management systems are introduced, which significantly increases the efficiency of the ecosystem and its components

Source: compiled by the authors based on [6].

mentation, robot-human interaction — play an important role in the concept of Industry 5.0. Also important are the transfer, storage, analysis of bioinformation data and energy efficiency as factors of business competitiveness [8].

A company that wants to achieve global competitiveness must change its existing traditional business models and increase investment in achieving social business goals. In fact, in Industry 5.0, the role of people and society in business is multiplying. The socialisation of business models implies a shift from creating new jobs and increasing employment to maximising the personalisation of products and providing better working conditions for employees, including through the maximum use of artificial intelligence.

In the framework of the Industry 5.0 concept, the company's employees are considered not as a "cost" but as an "investment", which gives an opportunity to develop both the company itself and its workforce. The uniqueness of this investment is that employees, by developing, improve the company, which gives them even more room for development. As such, a business should be keen to invest in the skills, capabilities, and well-being of its workforce to achieve its goals. This approach is very different from simply balancing employee costs and financial returns: human capital becomes more valuable, which is an important feature of business models within Industry 5.0.

It is important to realise that the Industry 5.0 concept is not limited to a social focus. Its key objective is to improve the economic performance of the business, and it does so by meeting the needs and interests of employees, as well as ensuring environmental sustainability and resource efficiency. "Resource efficiency is about producing "better with less", optimising the relationship between outputs and resource inputs" [9]. A company or an entire industry operating under the Industry 5.0 concept must be prepared to rapidly adapt its entire business model to the changing conditions of key value chains [9].

In the long term, the overall benefit to industry is increased competitiveness through successful adaptation to a changing world and new markets.

Thus, in the context of Industry 5.0, changes in business models are inevitable. In fact, all these transformations can be described by two factors:

1. Industry 4.0 and Industry 5.0 offer a huge space for companies to update their business models — thanks to the possibilities of using AI and other high technologies, enterprises can apply virtually exclusive business models, which makes them unique to a large extent.

2. The role of the human being in an organisation's business model is multiplied, both as a consumer (external side) and as an employee (internal side). This is especially noticeable against the backdrop of the growing use of AI and high technologies.

In the course of transformations in business models, the requirements for innovation activities of enterprises are changing. If earlier innovations primarily concerned the introduction of technologies into business activities (in terms of production methods or its organisation), as well as the introduction of new (innovative) products to the market, then within the framework of Industry 4.0 and Industry 5.0 concepts the role of innovations has changed significantly — they are becoming the flagships of company development.

The task of innovation is not just to select, implement and introduce new technologies, but to achieve a unique combination of technological, social, and environmental aspects of business activity, as they all play an equal role in the concepts under study.

The same can be said about the result of the company's activity — a finished product or service. If earlier innovativeness was already a

significant factor of choice for the client, then from the point of view of the studied concepts innovativeness has become a unique combination of technology, environmental friendliness, social orientation and personalisation of a product or service.

ECOSYSTEM APPROACH AND THE IMPORTANCE OF MARKETING ECOSYSTEMS IN THE ACTIVITIES OF INNOVATIVE COMPANIES

Industry 4.0 techno-economic paradigm is characterised by the introduction of digital technologies in the management of an organisation to increase its digital maturity through the informatisation and automation of production and the transition to cyber-physical systems.

The term is used to represent processes in a socio-economic subsystem. The term "ecosystem" is used to represent the different levels of information transformation in an integrated way.

A very detailed description of the latter and its role in business functioning is given by G.B. Kleiner [10]. The ecosystem, in his opinion, becomes a natural shell, the main task of which is to implement the interaction of the enterprise with the external environment through the association in clusters, platforms, business incubators, which allows to achieve effective, smooth, and connected functioning of the company. Thus, the ecosystem:

- is a natural extension of the enterprise as a concept and as a form of organisation of real economic activity;
- becomes a logical extension of the cluster economy.
- contains several interrelated business systems.

The requirements for specifying the composition and content of technical and technological platforms during the development and operation of modern business systems, which are inextricably linked to the stages of innovative design, become an integrating basis for the formation of digital ecosystems. At the pre-project stages (at the level of forming technical specifications), marketing research methods and models are used, as this approach shifts the focus from studying the market as a whole to analysing an individual ecosystem, resulting in more authentic results.

In his other work, G.B. Kleiner applies an ecosystem approach to the description of economic structure: he presents the market not as a "pile of grains of sand", where one differs from another only in size. Each ecosystem is a special planet with its own history, culture, and genetic mechanisms of trait inheritance. Since ecosystems by definition lack centralised management, self-organisation mechanisms must be organically embedded in their institutional structure. Within an ecosystem, a special role is given to human control and instruments of interaction between enterprises [11].

Analysing the specifics of the ecosystem approach, it should be emphasised that an ecosystem cannot fully function without regular qualitative information exchange. This approach is necessary for the emergence of competitiveness strategies of both individual market participants and entire industries, regions and even the state as a whole [12]. Indeed, today we are witnessing that even at the state level, it is deep ecosystem interactions that prove to be most effective.

One of the explanations for this phenomenon is given in the works of foreign experts in this field,[1] who call the forces affecting ecosystem development both centrifugal and centripetal,[2]

[1] Information portal Faces of HR: Don Robertson on Building an Ecosystem of Connectivity, Culture & Talent. By Bianca Herron, Editor, HR Daily Advisor Staff May 18, 2023 Faces of HR. URL: https://hrdailyadvisor.blr.com/2023/05/18/don-robertson-on-building-an-ecosystem-of-connectivety-culture-and-talent/ (accessed on 05.11.2023).

[2] Information portal Ove Granstranda, Marcus Holgersson Innovation ecosystems: A conceptual review and a new definition. URL: https://www.ip-research.org/wp-content/

which serve as the basis for maintaining balance both within an individual company and the entire ecosystem [13–14]. It is these factors that allow companies within an ecosystem to remain resilient in times of crisis, as well as to easily (or more easily) transition through various transformational processes [15].

It should be noted that domestic and foreign experts actually agree on the definition of the concept of "ecosystem", its features and role in business. At the same time, the ecosystem concept itself has been considered in foreign literature for more than 20 years. A number of works by foreign scientists, studied by the authors of this article during its preparation, emphasise the ecosystem as a logical (and largely inevitable) development of business, including the consumer (which does not contradict the opinion of domestic experts, but is separately emphasised). In general, we can talk about a harmonious combination of domestic and foreign understanding and interpretation of the term "ecosystem".

The concept of marketing ecosystem should be considered separately as having special significance in the context of organisation and conduct of marketing research. However, the analysis of literature shows that it is not fully defined and considered in scientific sources.

In the publication [16] the marketing ecosystem is defined as "an integration of participants implementing marketing goals aimed at complementing and developing business, building customer-centric business models", which includes:

- suppliers;
- intermediaries;
- investors;
- government agencies;
- universities.

uploads/2020/01/Granstrand-Holgersson-2020-Technovation-Innovation-ecosystems-a-conceptual-review-and-a-new-definition.pdf (accessed on 06.11.2023).

At the same time, this paper considers only the external actors in the marketing ecosystem, while the internal component is left out of the picture.

In [17] we can find an interesting comparison between the digital marketing ecosystem and the classical marketing approach. The former is constantly updated, there is an evolution of marketing tools and approaches to work. In addition, the marketing ecosystem can be used by a company cooperating with a large number of partners, customers, suppliers, distributors, as it is very flexible and is constantly in the process of development.

Based on the studied information, the authors of this study propose to define a marketing ecosystem as a special approach to the organisation of marketing activities of an enterprise, based on the digitalisation of marketing tools and activities; including all participants of the company's activities (both internal and external stakeholders); characterised by constant updating, development and change both in terms of tools and approaches, as well as the goals of activities and the composition of participants. And it is quite obvious that such an approach can be realised only with a high degree of digital business transformation, as the ecosystem can only function on the basis of modern digital tools and models.

Nowadays, enterprises are increasingly using the concept of not just a marketing ecosystem, but a *digital* marketing ecosystem to achieve resource sharing and new product creation by digitising business processes and, consequently, simplifying interactions within the ecosystem and making them more efficient.

Within such an ecosystem, digital platforms, devices, and services work in a single context, with the consumer at its centre. The ecosystem provides an effective link between the consumer and the company's internal resources

in order to manufacture a product that best meets the consumer's needs.

There are not too many marketing ecosystems on the domestic market today. This is due to the fact that the concept itself is still at the stage of formation. The vast majority of such ecosystems exist and are developing quite actively in IT and industrial production. In these industries, consumer involvement in the activities of companies is very high due to the fact that products are often customised.

Thus, the mutual work of the customer, manufacturer, supplier, and management staff leads to the formation of a marketing ecosystem as business processes are renewed and participants are expanded to meet commercial interests.

Marketplaces such as Ozon, Wildberries, Yandex Market, etc. can be cited as the most common example of a digital marketing ecosystem. This is a digital business that closely links sellers and marketplaces in the context of constant improvement of business processes and the composition of participants. At the same time, consumers practically do not participate in the work of marketplaces as ecosystems — they are assigned the modest role of authors of product reviews.

Yandex and a number of its services serve as a better example of a marketing ecosystem. For example, Yandex Navigator, which allows users to transmit data about the traffic situation themselves, and allows owners of businesses or institutions to update information about them. In this way, the ecosystem optimises all processes as much as possible to meet the diverse needs of audiences, vendors, and other participants.

As for IT companies, they are starting to pay attention to the marketing ecosystem approach, as it is in this sector that it is possible to maximise customer satisfaction by including them in the production chain at different stages, for which modern ITSM tools are used.

SPECIFICS OF MARKETING RESEARCH IN THE ECOSYSTEM APPROACH

From the above we can conclude about the changing role of marketing research within the concept of Industry 4.0, as well as its tools and the targeting of the research process itself.

Firstly, digital technologies are used more frequently (digital maturity is increasing). Research results can be more quickly implemented in the company's activities thanks to the introduction of big data and AI technologies. Within the concept of Industry 4.0, marketing research is transforming from cumbersome periodic processes into permanent background research due to the fact that it can itself be managed by artificial intelligence and deliver results that meet the requirements of operational planning.

Secondly, in the context of Industry 4.0, the objects of study are changing. The ecosystem approach involves studying the ecosystem and all its participants (including the external environment) and ranking the objects of study from the closest elements of one ecosystem to those in another.

In an ecosystem approach, the organisation studies other ecosystem members (as well as other ecosystems); the ecosystem itself learns about other, similar ecosystems.

If in the classical model an enterprise explores the external environment of direct and indirect impact, in Industry 4.0 special attention is paid to the internal environment — it is a normal linear business process within the framework of solving some problem. As far as the marketing ecosystem is concerned, market research plays an integrative role among others.

Among them we can emphasise the following:

1. The company studies its internal environment in order to accumulate large amounts of internal information (continuous process).

2. The company analyses the external environment consisting of other participants of the ecosystem — suppliers, customers, in-

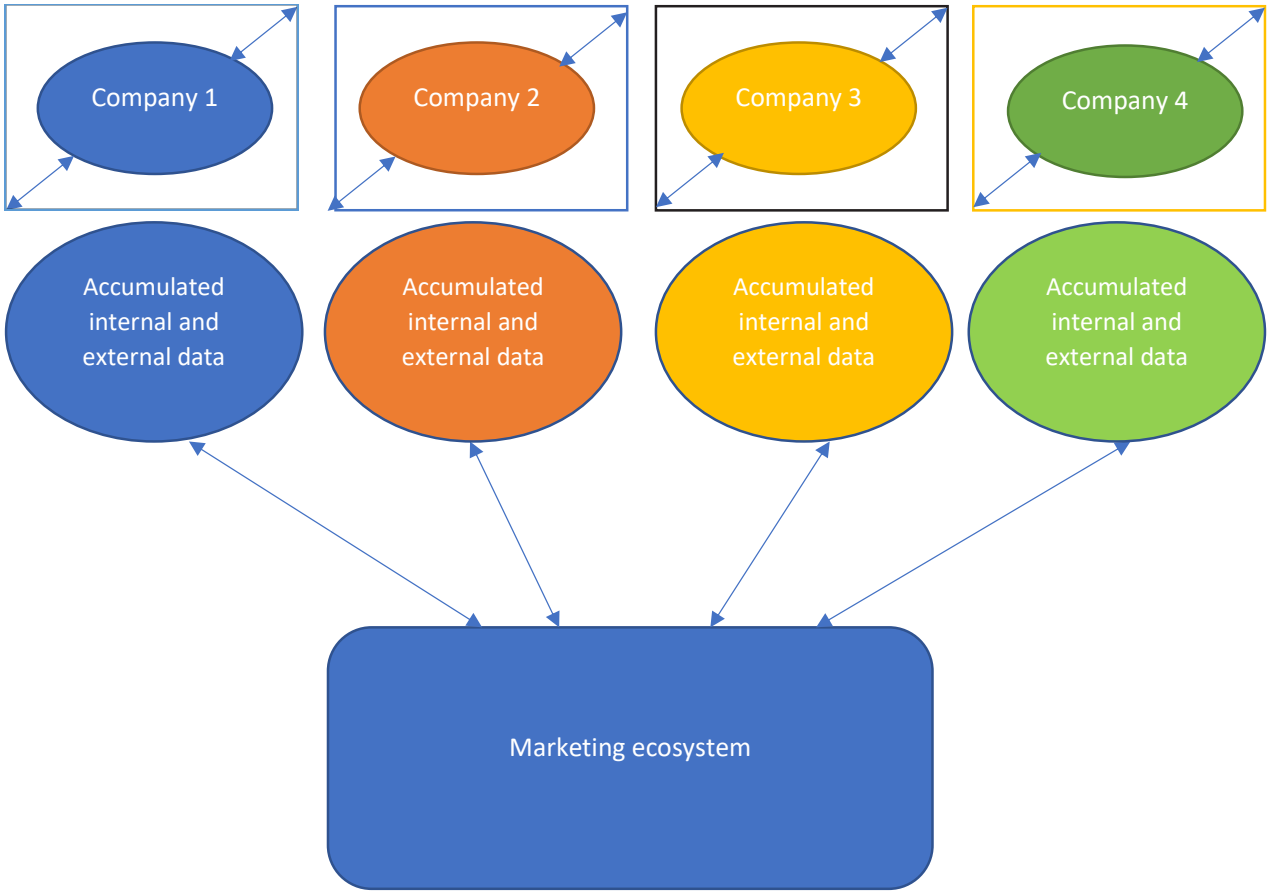

Fig. 1. **Integrating enterprise data into a new marketing ecosystem**

Source: compiled by the authors.

termediaries, investors, regulators (continuous process). Its peculiarity is that it is bidirectional — all participants of the ecosystem study each other.

3. The company's research of other ecosystems — it has a targeted focus and is implemented when necessary.

4. The ecosystem explores other ecosystems. Also, a goal-oriented process that is focused on optimising business processes within the ecosystem.

Market research allows you to create a chain of pumping marketing information across different organisations within the same ecosystem. The situation can be considered on the simplest example — a marketplace, where, thanks to a structured marketing data collection scheme, each seller collects information about consumers, the level of demand, and price elasticity and provides the marketplace with it. As a result, the latter receives an impressive amount of data from each seller, and this information is internal for the marketplace and external — for the seller. But the marketplace itself also collects external marketing information and sends it to sellers to increase the efficiency of their activities. This is the transfer (or pumping) of information between the external and internal circuits of the ecosystem. To ensure its maximum efficiency, it is important to use the ITSM approach when organising the information architecture of the ecosystem.

At the same time, one of the most important goals of marketing research is not just to solve a

specific business problem. On the contrary, the main goal is to accumulate a large amount of data for training artificial intelligence in order to increase the efficiency of managerial decision making.

The integration of enterprises (companies, organisations) into one marketing ecosystem is shown in *Fig. 1*. We are talking about a number of companies that operate in separate markets (the latter are highlighted by squares in the figure) and participate in a constant information exchange with the external market, resulting in the accumulation of internal and external data of the organisation.

In classical marketing, this stage would be the final one, as the collection of information for further use was one of the most important tasks of the business. But with the ecosystem approach, companies begin to share data through a new marketing ecosystem, which actually becomes not just a tool for generating joint information about markets and companies, but also enables the transformation of the business model of each of the companies connected to the marketing ecosystem, acting as a communication platform. When the potential of the ecosystem approach is maximised, research activities are integrated, and duplicative functions and processes are eliminated. The boundaries of companies within the system are erased — companies begin to complement each other in the research of external ecosystems, and there is no need to study the external environment of direct impact, as the maximum amount of information is accumulated.

It is important to recognise that businesses with very different business models operate within the same ecosystem. This is often the principle behind the ecosystem — organisations with complementary business models are brought together to form an ecosystem.

Thanks to the development of market research and increased transparency of boundaries within the ecosystem, information from each business model flows into a common global supermodel, realised in the form of artificial superintelligence and managing the ecosystem as a whole. This blurring of boundaries and the formation of a unified knowledge base within the supermodel is possible through the use of:

- innovative approaches to business process design;
- state-of-the-art information technologies.

A special example of uniting organisations in the construction sector into one marketing ecosystem is worth considering. It includes such companies as developers, designers, design companies, suppliers, banks, real estate agencies. The ultimate goal in the construction market is the implementation of quality housing for the consumer, and all participants of the ecosystem are interested in its implementation.

In a normal situation, each company generates its own information and uses it to solve its own narrow tasks. While within the marketing ecosystem, organisations involved in the design, construction, lending, and implementation of a particular residential complex can combine their marketing expertise and make a comprehensive, high-quality offer for the end customer.

Marketing research in Industry 5.0 has its own specificity, consisting of:

1) a unique combination of artificial intelligence and humans;

2) an emphasis on studying ecosystems rather than the market or individual companies;

3) the use of qualitative research for decision-making.

This enables fundamental study of business environments, special attention to the interaction of ecosystem components, and the "humanisation" of marketing research technologies by adding unique human perceptions and expectations to the management decision-making process.

MARKETING ECOSYSTEM AND INNOVATION DESIGN IN AN INDUSTRY 5.0 FRAMEWORK

This section focuses on the issue of designing a marketing ecosystem, which, and this is important to note, is first and foremost an ecosystem.

According to the BCG Henderson Institute,[3] there are 6 questions to work through when designing an ecosystem:

- What problem does the ecosystem solve?
- Who can be part of the ecosystem?
- What should the governance model be like?
- How to capitalise on the creation of the ecosystem?
- How to get an ecosystem up and running?
- How to ensure the development and longevity of an ecosystem?

The answers are specific to virtually any ecosystem and are relevant to marketing ecosystem design as well. And it is the combination of solutions to each of these questions that forms the unique DNA of each ecosystem.

In turn, experts from the consulting company McKinsey offer the following approaches to building an ecosystem[4]:

1. Defining an ecosystem strategy:
- Identifying the most relevant trends.
- Planning the desired ecosystem and defining value.
- Shaping the key value proposition.

2. Designing the ecosystem:
- Consumers.
- Industries and partners.
- Products and services.

3. Building the ecosystem.

To achieve success in design, it is necessary to create a flexible ecosystem operating model that should not only continuously introduce new solutions, but also manage current ones by maintaining their advantages and eliminating their disadvantages. However, it is important to realise that the concept of ecosystem in general and marketing ecosystem in particular is applied primarily within the concepts of Industry 4.0 and Industry 5.0, implemented as part of the digital transformation of business, which leads to an innovative turnaround of companies. From the above, the authors of the article conclude that the marketing ecosystem is the result of an innovative approach, so its creation should be guided by the methodology of innovation design.

According to the authors, ecosystem (including marketing) design should include 3 consecutive steps (*Fig. 2*):

1. Basic — response to the 6 design steps.
2. Descriptive — detailed description of the ecosystem participants and its strategy.
3. Innovative — innovative design of the ecosystem.

The task of innovative design in the conditions of Industry 4.0 and Industry 5.0 is the digital transformation of business processes and business models, which is associated with the implementation of the task of continuous value addition of business processes. Qualitatively new characteristics of business models are provided by the stage of preliminary selection of the type of the latter and organisation of business processes within them.

Innovative design, based on market research into the needs of customers and partners and their involvement in the production of the innovation, leads to optimised resources and reduced time to implement the resulting solutions [18].

Time is a critical factor in the process of creating new products. It can take months or even years from the birth of an idea to the release of the first prototype, and even longer from prototyping to mass production. A long prod-

[3] How Do You "Design" a Business Ecosystem? BCGURL (official website). URL: https://www.bcg.com/publications/2020/how-do-you-design-a- business-ecosystem (accessed on 12.11.2023).

[4] A design-led approach to embracing an ecosystem strategy. McKinsey (official website). URL: https://www.mckinsey.com/capabilities/mckinsey-design/our-insights/a-design-led-approach-to-embracing-an-ecosystem-strategy (accessed on 12.11.2023).

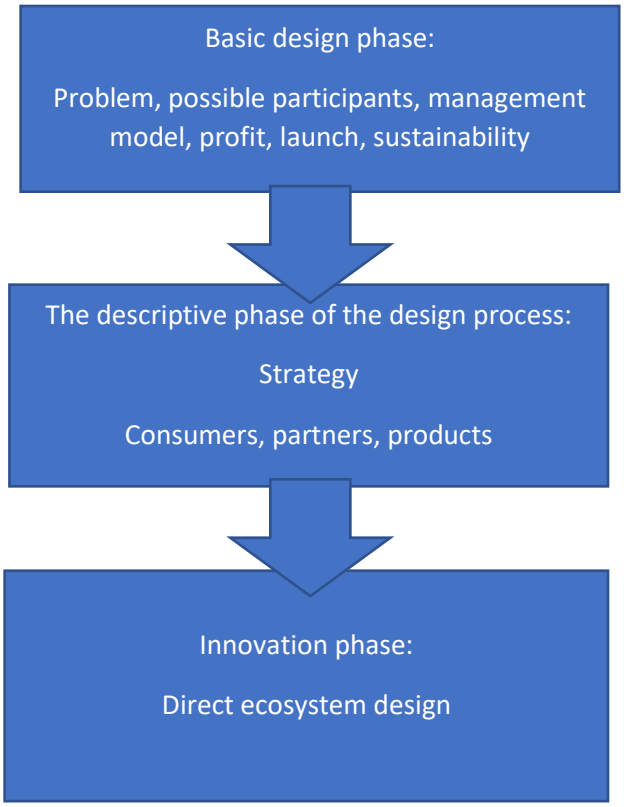

Fig. 2. **Ecosystem Design Stages**

Source: compiled by the authors.

uct development cycle has two disadvantages. Firstly, the more time spent, the greater the resource consumption and the more expensive the product. Secondly, it is not uncommon for a new product to become obsolete before development is complete. It is also important to keep in mind the "newcomer effect", which gives an innovative product a clear advantage in the market. In this regard, reducing product development time is one of the most important factors of enterprise competitiveness, and it is the innovative approach to the design of ecosystems of organisations that contributes to its development.

The next important circumstance that can be affected by innovative design is the risk factor. Launching new products is always a risk; it cannot be ignored. Research helps to reduce uncertainty, but it does not protect 100 per cent. And innovative design, in which forecasting plays a special role, helps to reduce the risk level of the project.

According to [19], the process of innovation design management includes such procedures as:

- approval of an effective strategy for innovative development of the enterprise;
- feasibility study of the efficiency of production and commercialisation of a specific innovative product;
- execution of accompanying documentation;
- innovation engineering.

It is worth noting that the authors of the article do not single out as a unique component the issues related to research and forecasting, which, in turn, occupy a central place in the process of innovative design. The specificity of the latter is that the innovation project can undergo a large number of changes, and the design itself does not end at

Table 2

Stages of innovative design of a new marketing ecosystem

Stage	Stage description	Stage result
Formation of a problem and emergence of an innovative idea (pre-project survey)	Identifying gaps in the current ecosystem, interacting business systems, business models, business processes. Carried out by auditing the current situation using continuous background internal marketing research	Clearly articulate the problems at hand and possible alternatives. Identification of requirements for a unified platform solution for process management
Conducting a set of studies to identify opportunities and threats	Create a research plan to fully analyse the situation within the existing ecosystem. Study of the entire array of internal and external data. Audit of business processes. Analysing each alternative for applicability within the company	Detailed description of the current situation. SWOT-analysis of the situation. Evaluation of all possible alternatives to change the situation. Selection of the most attractive alternative. Selection of the composition of digital technologies transforming the interaction of business systems into a single ecosystem
Development of a prototype of a new marketing ecosystem	Based on the analysis and the selected alternative, a prototype of the new ecosystem is created, which consists of a description of the interacting business systems and optimised business processes. At this stage, the accumulated market research data is used to implement new business processes for the interacting business systems	A document describing the interaction of business systems and optimised business processes and their combination in a new ecosystem
Testing a prototype of the new marketing ecosystem	Business processes of interacting business systems are tested in two ways: initial testing takes place using digital twin technology; then test implementation of the new business process into the company's operations. The role of marketing research at this stage is to assess the changes in the company's operations when each individual process is implemented	Evaluation of each optimised business process and their combination. Making final decisions on optimising business processes
Development of project documentation	Part of the previous stage, which creates a detailed description of the interaction of business systems and optimised business processes	Emergence of regulatory documents, their harmonisation and approval
Creation of a new marketing ecosystem	Completion of optimisation of all business processes, aligning them with each other. Complete "assembly" of the ecosystem. Using market research to control the company's external environment	Fully ready for implementation of the business system
Implementing a new marketing ecosystem	Full implementation of all updated business processes, coordination between them. Development of project documentation, distribution of roles of performers and process participants. Marketing research at this stage is necessary to control the external and internal situation in the organisation during the implementation of the new ecosystem	Functioning of the new ecosystem

Table 2 (continued)

Stage	Stage description	Stage result
Operation of the new marketing ecosystem	Continuous analysis of the implemented system as a whole and each business process separately. Identification of shortcomings in the process of work. Marketing research is needed to record changes in the external environment and internal content of the company	Conclusion on the successful implementation of the innovation ecosystem
Evaluating changes in enterprise operations	Understanding how the situation in the company has changed, describing the changes, assessing the current situation. Performed including marketing research methods	Final judgement on whether the stated problem has been solved

Source: compiled by the authors.

the moment of launching products into mass production. The special role of research lies in the fact that it is research that allows to make improvements to the product during its use and to continue the process of improving the innovation project.

It is clear that innovative design today is only available to enterprises with a high level of digital transformation based on continuous analyses of both external and internal data flows.

Such design can be used not only in the direct development of new products — according to the authors [20], it can also diversify the company's business models by searching for new areas of development, as well as modernising its current business processes, thereby helping it to develop its activities. In addition, innovative design can be involved in such areas as PR and GR through attracting the attention of the company's stakeholders to its new methods of work. This idea is very interesting, as it presents innovative design as a non-linear process, consisting simultaneously of directly designing new types of products using digital technologies and the methodology of business diversification of the company's business model.

The innovation design process can be presented in the form of the following steps:

1. Problem formation and emergence of innovative idea.
2. Conducting a set of studies to identify opportunities and threats.
3. Development of the innovation prototype.
4. Testing the innovation prototype.
5. Development of project documentation.
6. Creation of the innovation project.
7. Implementation of the innovation project.
8. Study of the implemented innovation project.
9. Evaluation of changes in the enterprise's activity.

When innovatively designing a new marketing ecosystem, the following stages should be envisaged (*Table 2*).

It is important to note that the described stages are passed not by a single company, but by all participants of the projected ecosystem, and in fact marketing research plays a significant role in each of them.

It can be postulated that the importance of the latter has increased in the context of Industry 4.0 and Industry 5.0 concepts. At the same time, human participation in project management processes has caused their "humanisation" in line with the Industry 5.0 concept.

CONCLUSIONS

The article provides an overview of the ecosystem approach on the example of different business models in the transition from the technological mode of Industry 4.0 to Industry 5.0. The marketing ecosystem is defined as the basis for interaction of customer-centric business models of different ecosystems within Industry 4.0. The authors of the study show the increasing role of marketing research at all stages of innovative design of marketing ecosystems in the context of end-to-end data integration on the principles of providing platform solutions.

The article characterises different types of business models in the transition from Industry 4.0 to Industry 5.0 and postulates that the transition to a new technological mode can be considered not as a qualitatively new concept, but as an evolutionary development of the Industry 4.0 concept.

Industry 4.0 implies the development of an ecosystem approach; in the context of Industry 5.0, the concept of "marketing ecosystem" is considered as part of this approach.

Within the framework of the ecosystem approach and marketing ecosystems, the role and format of application of marketing research is changing. They become a tool for studying the ecosystem from the company's side and vice versa, as well as the company's external environment and other ecosystems. In addition, with the right approach, they serve as a tool for pumping information between the ecosystem and its components.

The article summarises the stages of practical development of an innovative project of business processes of a new marketing ecosystem, highlighting the role of marketing research in the design framework.

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Knowledge Management: Any changes in the Research Agenda?

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ABSTRACT

The concept of knowledge management formed at the end of the 20th century. At the same time, the vector of this concept is evolving due to the emergence of new business models, technologies, and the recognition of the "soft" components of success or the so-called "soft skills", and changes in the strategies of organizations.

The article is a systematic scientific review, the **purpose** of which is to identify the mainstream in the field of economics and knowledge management. The **methodology** of the article is based on a set of approaches, including the knowledge-based theory of the firm, the concepts of knowledge engineering, organizational learning, dynamic capabilities and knowledge transformation, etc., and the research methodology is based on taxonomic and cluster analysis of the most cited English-language publications using tools embedded in the VOSviewer software product. The information base consisted of articles for 2018–2024, selected according to the research topic and keywords "Knowledge Management", and placed in the Dimensions database. As a result, we identified 6 clusters and formalized the directions of modern research in the field of knowledge management. In each cluster, a content analysis of the most cited articles was carried out. The research agenda is currently focused on two main issues: the impact of digitalization and digital technologies on the choice, generation and dissemination of knowledge in an organization; the impact of knowledge on innovation as a mediator of business performance, including its environmental and social aspects. In fact, a consensus has been found in understanding the basic postulates of knowledge management. However, the problem of finding the "good" metrics for assessing the knowledge of an organization and the impact of their level on business performance remains relevant. It is shown that among the theoretical frameworks in knowledge management, the most popular are knowledge engineering and knowledge-based theory of the firm. The results of the study will be useful to managers-practitioners and researchers in the development of effective knowledge management systems.

Keywords: knowledge; knowledge management; knowledge economy; systematicc literature and scientific review; organization efficiency and effectiveness

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INTRODUCTION

Over the last half a century, management as a scientific direction has been developing rapidly, which leads to the emergence of many separate theories and approaches in managerial thought. Changes in institutional contexts and the emergence of new forms of business organisation determine not only the development of terminological apparatus, but also the evolution of already established well-known theoretical trends. One of them, which in many ways determines the fundamental research platform of modern management, is the ***concept of Knowledge Management***.

The term "knowledge management" was introduced in 1986 by K. Wiig [1], and the concept itself is broadly based on the idea that knowledge is a special, unique resource that creates and further maintains sustainable competitive advantages of an organisation.

There are a number of trends changing the knowledge management system in companies [2, p. 15–17]:

in terms of knowledge acquisition — mandatory mastery of information and digital technologies as a means of accessing data processing and integrating them into the company's business processes;

in terms of knowledge generation and dissemination — development of the phenomenon of information clustering, decision-making and delegation of authority;

in terms of knowledge commercialisation — attention to improving the legal protection of transactions, cybersecurity, as well as the formation of new mechanisms of interaction between agents in the markets of intangible goods (where the risks associated with the asymmetry of information are high).

Transformation of markets and mechanisms of their functioning, emergence of decentralised management technologies (blockchain) and development of network resources, intensification of regional competition will be the drivers shifting the focus in knowledge management in an attempt to find relevant answers to two questions: 1) what knowledge should be generated; 2) how to retain and develop general corporate knowledge in the conditions of an open economy.

In this regard, the authors of the article aim to identify the main directions of research in the field of knowledge management using the method of systematic scientific review of publications for the last 5 years (2018–2023). The intermediate sections (tasks) of the work are: clarification of the general terminology and theoretical framework of the knowledge management concept; description of the methodology of systematised scientific review; identification of research directions in the field of knowledge management by clustering method and their content analysis. Due to the limited scope of the study, the research is focused on the study of English-language publications in the Dimensions database.[1]

ORIGINS AND BASIC TENETS OF KNOWLEDGE MANAGEMENT

According to the definition by J. Probst et al., knowledge is a combination of information and abilities that individuals use to solve problems. Knowledge consists of theoretical and practical cognitions, as well as routines (rules of behaviour) and is based on data and information, but unlike them it is always connected with a certain person, as it is derived from his / her expectations [3, p. 22].

Transformation of knowledge into competitiveness (efficiency) of an organisation consists of four stages: "obtaining — generation — dissemination — materialisation". [4]. Ideally, these

[1] Dimensions — is a digital scientometric database covering hundreds of millions of publications, grants, strategy papers, datasets, and patents. It makes it possible to analyse not only publication activity and citations on a particular topic, but also to study the volume and dynamics of research grants in selected fields with the accuracy of specific teams and scientific organisations.

processes are self-organising and occur simultaneously at the levels of employees, departments, and intercompany interaction.

The modern methodological framework of approaches to the unified concept of knowledge management is heterogeneous. Back in 1979, P. Drucker introduced the concept of "knowledge worker" (the worker, who is creating knowledge) [5]. He also proposes the first provisions of the knowledge management theory [6–8]:

- knowledge is a key resource, and its distribution among business structures is shaping the new global socio-economic order;
- the main measure of knowledge, which determines the ability to compete, is information and communication and other high technologies; hence, it follows that high-tech companies will be the market leaders, creating the "face" of the world economy;
- the mental worker is a generator of knowledge; knowledge work is defined not by quantity, but by its results;
- mental labour workers require new rules and approaches to management; their main feature is the ability to manage themselves, self-analysis, and autonomy. In the process of development of P. Drucker's ideas, the key fundamental-theoretical directions of Knowledge Management were formed: the so-called knowledge-based theory of the firm, as well as the concept of organisational learning, dynamic abilities and knowledge transformation, knowledge engineering, intellectual capital and human resource management, and a number of others. Let us dwell on them in more detail.

Studies devoted to knowledge-based resources as sources of firm competitiveness appeared at the end of the 20th century and are embedded in the theoretical and theoretical framework of the resource-based approach (resource-based view). On its basis, in 1996 R. Grant [9] developed the *theory of the firm based on knowledge*, according to which it is the key resource of the organisation, and the company itself is considered as a bundle of specialists' knowledge materialising into products.

The development of research within the framework of this theory is aimed at finding answers to two main questions: 1) what properties should knowledge as a resource have in order for it to lead the organisation to better results? 2) how strong and sustainable is the link between knowledge and organisational performance?

In search of an answer to these questions, knowledge has been categorised in certain ways, in particular (and most importantly) by distinguishing between codified (explicit) and uncodified (implicit) forms. Explicit (formalised) knowledge is easily transferable. Implicit [informalised (know-how)] knowledge includes skills, experience of the firm's employees, mental models, organisational routines. In addition, there is the so-called "highly unformalised knowledge" [10], which, as a rule, relates to individual skills that a person cannot express verbally, but according to which he/she operates or acts.

This classification gave rise to the study of the well-known replication paradox [11], which states that a company, in an effort to increase the speed of knowledge sharing within the organisation, codifies it, but at the same time increases the likelihood that it will become available to competitors due to formalisation. Accelerating the replication of knowledge in order to activate the growth rate of the firm, it is necessary to exercise strict control over its dissemination in order to maintain its market position.

In addition, knowledge differs in its ability to support the competitiveness of the organisation. Adhering to this point of view, M. H. Zack [12] divides them into 3 groups:

1) basic knowledge (core knowledge), characterised by a minimum set and level. It does not form a long-term competitive advantage. All industry participants have such knowledge;

2) advanced knowledge, which allows an

enterprise to be competitive due to their differentiation by specific content;

3) innovative knowledge, which can become the basis of leadership of the enterprise in the industry and allow it to change the rules of the game.

It is this classification that attempts to form a logical chain of transformation of knowledge into efficiency through innovation.

Both of these classifications have become the basis for many empirical studies devoted to the analysis of the impact of different categories and types of knowledge on the performance of organisations. For example, [13] proved a significant positive relationship between the management of tacit knowledge and the firm's production results, and articles [14, 15] provided convincing evidence of the transformation of knowledge into innovation, which, in turn, had a positive impact on business performance.

Competitive advantage depends on how effectively knowledge is integrated into business processes. The scientific *school of organisational learning* focuses on learning as a basic mechanism for creating competitive advantage in a constantly changing environment [16]. At the same time, specialisation and simplification (easing) are proposed as stimulation or incentive tools [17].

Two basic mechanisms have been identified for knowledge integration: instructions (orders) and routines (established practices). The importance of the former increases with the complexity of their action, dissemination, and the diversity of final results.

One of the basic articles within the framework of this theoretical approach is the article by L. Argote and P. Ingram [18], which links the competitive advantages of an organisation with the process of knowledge transfer. According to the authors, the quality of transfer depends on the embedding of information in one of the so-called "repositories" (employees, groups, units/departments/divisions), and the quality of embedding, in turn, depends on the level of socialisation of employees, organisational culture and other factors.

The theory of organisational learning is complemented by *the concept of "learning organisation"* developed in the works of P. Senge [19] and D.A. Garvin [20]. Judging by the name, the concept implies that learning is not just the accumulation of knowledge, but the meaningful development of skills to use it. A learning organisation has inherent features of the internal labour market and is characterised by the following attributes:

1) an organisation's strategy is the result of its approach to learning;

2) the principles of participation, awareness and involvement of employees in the organisation's strategy become key to the organisation's activities;

3) the existence of constant internal knowledge sharing and encouragement of business process flexibility;

4) benchmarking — analysis (a kind of "scanning") by lower-level employees of the entire information field on the topic of the environment.

The development of the so-called "organisational" branch of the knowledge management concept (a branch focusing on business processes of knowledge management) has led to the understanding of the importance of behaviour, motivation of employees, the need to compile and study their personal and psychological portraits. [21, 22].

There are works linking the generation of ideas by employees and organisational factors that affect the effectiveness of innovation [21–23]. Their authors show that the most important factor determining the level of innovative knowledge generation is motivation. In its turn, the condition for high motivation is the application of management practices oriented at maintaining the psycho-physiological health of employees (health-oriented leadership, HoL)

[24], as well as organisational fairness, the level of trust [25] and a number of others.

Taking into account the principles of human resource management theory and resource-based approach, the ideology of *intellectual capital* as a set of knowledge, information, intellectual property and experience that can be used to create wealth is developing in parallel [26].

In the conditions of external shocks at the turn of the twentieth and twenty-first centuries, firms increasingly had to rely on the internal potential of knowledge management. Therefore, the dynamic capabilities theory [27] which was being developed during this period and the *knowledge transformation approach* [28] that was based upon this theory, focus on the mechanisms of resource transformation.

Research authors who hold this view of the knowledge management concept focus on an organisation's ability to "capture" both internal and external knowledge and to retain it over time within the firm [29].

Thus, a classic work is the model of creating new organisational knowledge developed by Japanese scientists I. Nonaka and H. Takeuchi [28]. They build such a logical relationship of knowledge management: "creation of organisational knowledge — continuous innovation — competitive advantages" and link the effectiveness of this transformation of knowledge to both the dynamic capabilities embedded in the organisation and the possibility of mutual "flow" of explicit and implicit knowledge into each other.

Nonaka and Takeuchi identify 4 ways of knowledge transformation: socialisation (from informalised to informalised); externalisation (from informalised to formalised); combination (from formalised to formalised); internalisation (from formalised to non-formalised).

Since knowledge as a category has a pronounced interdisciplinary character, there are a number of "related" approaches to the concept of knowledge management. One of its most prominent areas is *knowledge engineering*, which focuses on the human being as a carrier of knowledge, as well as technical solutions that facilitate its extraction. Accordingly, the main vector of research is focused on digital and information technologies as a support system for knowledge management [30–32].

All existing theories and approaches together represent the theoretical framework of the modern concept of knowledge management,

Table 1

Algorithm for taxonomic study of publications on knowledge management topics

No.	Stage	Stage content
1	Data collection	Formation of a sample of publications in the international scientific database Dmensions by the keyword phrase "knowledge management". Mapping cross-bibliographic links between publications
2	Selecting a software product for conducting analyses	Analysis of available software products that allow working with English-language publications. Selection of VOSviewer software program as the most relevant to the research objectives
3	Data processing	Selection of 2500 publications using the Bibliographic coupling function. Clustering of publications according to cross-bibliographic coupling. Selection of the most cited publications in each cluster
4	Interpretation of results	Identification of research areas within the framework of knowledge management in English-language scientific publications

Source: compiled by the authors.

however, depending on the current agenda, they are adjusted under the influence of new practices and challenges of the external environment that can globally change the methodological platform of management science: these include the COVID-19 pan-demic, active deglobalisation, and at the same time the rapid development of global digital platforms.

MATERIALS AND METHODS

Systematic literature review is a method of taxonomic study of publications, the algorithm of which is presented in *Table 1*.

The information basis of the study was the English-language papers published in the period from 2018 to 2023 in the international scientific database Dimensions and selected on 6 June 2023 by the keyword combination "knowledge management". Over the entire period of its existence, the database contains 10,597 thousand articles on the topic under study, which indicates a long-standing and active attention to it.

We assume that the citation rate can serve as an indicator of the scientific community's interest in the ideas presented in a particular paper, and the most cited articles represent the main directions of research in the current period of time.

Using the Bibliographic coupling function of the VOSviewer software, the text of 2500 most relevant articles according to Dimensions was analysed — a graphic visualisation of the matches is shown in the *Figure below*. 127,265 links and 1000 key patterns were identified. A pattern represents an individual publication that is the target of citations or links. The patterns are linked together (based on citations or references) to form a link graph).

Further, all articles (1000 patterns) were combined into clusters using VOSviewer software (*highlighted in the figure*). The clustering results are presented in *Table 2*.

Table 2 data shows that the research agenda on the topic of knowledge management is formally differentiated into 6 areas. At this stage of the research, a number of intermediate conclusions can be drawn.

Firstly, the main topics of publications are related to two primary issues:

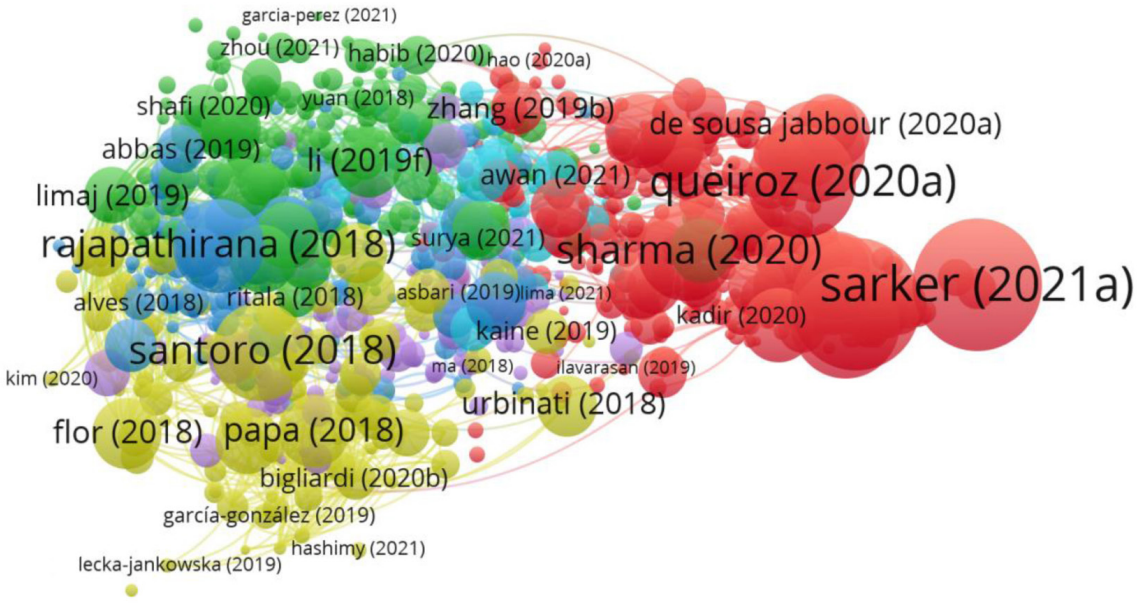

Fig. **Bibliographic coupling map**

Source: compiled by the author with the help of VOSviewer.

Table 2

Clustering of English-language studies on knowledge management in International scientific metric database Dimensions

Cluster	1 (red)	2 (green)	3 (blue)	4 (yellow)	5 (purple)	6 (light blue)
Number of articles, units. (%)	365 (36.5)	218 (21.8)	173 (17.3)	109 (10.9)	106 (10.6)	29 (2.9)
Research topics	Industry 4;0	Impact of innovation potential on the company's performance	Innovations	Digital technologies	Environmental responsibility and corporate innovation	Big-data analytics
Related fields of research defined by keywords	- Machine learning; - manufacturing industry; - Industry 4;0; COVID-19; - supply chains; - digitalisation; artificial intelligence; - data science; predictive analytics; - intelligent applications; - digital strategy	Corporate environmental responsibility; - corporate innovation; - firm value; - encompassing capacity; - cultural balance; - research innovation; - operational innovation	- Innovation potential; - innovation efficiency; - market indicators; - financial indicators; - meta-analysis; - eco-innovation barriers; - digital business models; - sustainable innovation; - absorptive capacity; - circular economy	- Internet of Things; - knowledge management system; - innovation potential; - open innovations; - small and medium-sized businesses	- Innovation in companies; - Autonomy; - management experience; - geography of innovation; - absorptive capacity; - emerging markets; - firm performance; - green innovation; - small and medium-sized businesses; - business transformation; - employee training	- Big data analytics; - Internet of Things; - strategic management; - knowledge-based theory; - dynamic capabilities theory; - closed-loop digital eco-economy; - competitive advantage; - internationalisation; - small and medium-sized business

Source: compiled by the author

Table 3

The characteristics of the most cited publications on knowledge management in International scientific metric database Dimensions as of 06.06.2023

Source	Number of citations	Type of article	Essence and results of the study
I. H. Sarker (2021)	733 (red)	Review article	An overview of machine learning algorithms is provided. It explains the principles of different types of machine learning and their applicability in areas such as cybersecurity systems, smart cities, healthcare, e-commerce, agriculture, etc.
J. Rjapathirana, Y. Hui (2018)	363 (blue)	Empirical	The relationship between firm's innovation capability, type of innovation and market and financial performance of insurance companies in Sri Lanka is investigated
G. Santoro, D. Vrontis и A. Thrassou (2018)	403 (yellow)	Empirical	The impact of Internet of Things (IoT) technology on knowledge management systems and open innovation opportunities is explored. IoT is seen as key, capable of transforming the way organisations manage knowledge and stimulate innovation processes. Structural equation modelling is used on a sample of 298 Italian firms
Z. Li, G. Liao, K. Albitar (2019)	208 (green)	Empirical	Investigates the impact of corporate environmental responsibility (CER) dimensions on business value, and the role that innovation plays in this process, on a sample of 496 publicly traded Chinese companies
N. Côrte-Real, P. Ruivo, T. Oliveira (2019)	127 (light blue)	Empirical	Investigates the relationship between the quality of big data analytics and value extraction through IoT technology in 618 European and American companies
N. Nuruzzaman, A. Gaur, R.B. Sambharya (2017)[1]	99 (purple)	Empirical	The prerequisites for the innovation performance of subsidiaries of multinational corporations or enterprises (MNEs) are investigated using a micro-foundation analysis approach. It is argued that managerial characteristics such as previous experience in similar corporations influence subsidiaries' innovation. A sample of 228 MNE subsidiaries from 11 countries was used

Source: compiled by the author.

*The article was published in January 2018 (the official issue date of the journal is December 2017), hence it was included in the sample.

• How and to what extent is knowledge transformed into innovation, and how does the latter affect the company's performance? In other words, the fundamental ideas of I. Nonaka and H. Takeuchi, as well as the knowledge theory of the firm, continue to form the basis of research in recent years.

• What is the significance of digital technologies and digital strategies (primarily data management strategies) in the field of knowledge management?

The above indicates that of the available research areas, the concept of knowledge engineering and the theory of the knowledge-based firm have received the most attention in the current period.

Secondly, a significant number of works are devoted to the development of medium and small enterprises (SMEs), which is observed in the three identified clusters out of six. It is obvious that in the case when a business cannot use mass-scale as its main competitive advantage, knowledge management technologies and the design of innovation management system are fundamental for its successful functioning.

RESULTS OF THE STUDY

Clustering results: selection of the most cited papers

The final stage of the study involves the selection and content analysis of the most cited works from each cluster (*Table 3*).

Content analysis of the most cited papers

Let's analyse in more detail the most cited papers published in International scientific metric database Dimensions on the topic of knowledge management in 2018–2023. Let us note that the first in this list is the article "Machine Learning: Algorithms, Real World Applications and Research Directions" [33], which represents such a direction as *knowledge engineering*. It was published in 2021, when, due to remote work during the COVID-19 pandemic, there was another surge of interest in digital technologies.

The paper convincingly proves that in the conditions of Industry 4.0, systematic data processing and the use of new intellectual technologies are embedded in the practice of business processes of organisations, as well as in entire spheres of social life. This predetermines the development of machine learning systems and necessitates the development of new procedures of "worker-machine" interaction. The management of machine learning algorithms changes the strategies of organisations and society in terms of knowledge management.

Since we observe a new stage in the development of digital technologies — the active use of artificial intelligence, augmented and virtual reality tools, the gradual transition from digital platforms to meta-universes [34], the theoretical framework and terminological apparatus of this direction are being comprehended. That is why review articles, for example, by the Australian scientist I.H. Sarker [33], are relevant in this context.

However, the most interesting, in our opinion, research on the subject of knowledge engineering is the most cited in the yellow cluster article by G. Santoro, D. Vrontis and A. Thrassou "The Internet of Things: Building a knowledge management system for open innovation and knowledge management capacity. Technological forecasting and social change" [35]. It should be noted that it retains a unified approach that incorporates the scientific achievements of the theory of knowledge transformation and the theory of the knowledge-based firm.

The main objective of this research paper is to investigate the relationship between knowledge management systems and open innovation type. The authors apply a structural equation modelling approach to a sample of 298 Italian firms in different industries, and their findings are very non-trivial and do make a tangible contribution to organisational knowledge management:

Firstly, the case of the Internet of Things (IoT) is used as an empirical example to demonstrate the changing mechanisms of knowledge management in organisations. In fact, IoT influences the company's approach to innovation and how it creates a new value proposition and therefore changes its business model.

Secondly, it is shown that the knowledge management system alone is not a key driver of competitive advantage. It contributes to the formation of the organisation's innovative potential.

Thirdly, it is reflected that the combination of explicit and implicit knowledge leads to better results.

Fourthly, it is stated that the development of intra-company knowledge on the basis of IoT contributes to the increase in the innovation potential of the organisation in terms of its successful embedding and functioning in open ecosystems due to institutions of more effective data exchange and commercialisation of data.

Thus, a conceptual model is developed based on the assumption that firms can use IoT as an effective tool to develop, implement and maintain a knowledge management system and to achieve higher innovation performance. The latter implies the ability to introduce new products/services, processes, or open new markets.

The most cited article from the blue sector, "Leveraging internet of things and big data analytics initiatives in European and American firms: is data quality a way to extract business value?" [36] is also related to the use of big data analytics (BDA) and Io T. Using econometric modelling on a sample of 618 companies, the authors argue that investment in these tools is critical to the competitiveness of organisations.

The second main direction of research is still the relevant topic of the *theory of the knowledge-based firm*. It is characterised by a well-developed analytical apparatus, so the articles written within these theoretical boundaries represent an attempt to clarify the specifics of the relationship between the categories "knowledge and business performance" in specific conditions: country, sectoral, socio-economic, etc. In addition, such works expand the tools of analysis and data volumes, as well as highlight additional factors and mediators that influence this relationship.

This is the approach in the article "Relationship between innovation capability, innovation type, and firm performance" [37], which is a serious empirical study. Based on microdata from a survey of 379 managers of insurance companies in Sri Lanka, the authors try to solve the dilemma, which is as follows: the development of organisations most often involves the use of open type of innovation; at the same time, insurance companies use closed information, which is considered a trade or commercial secret. Are these companies able to generate this type of knowledge into innovative capabilities and how does this affect their effectiveness?

The results of the study confirmed the hypotheses that the innovation potential of insurance companies has a positive and strong influence on the performance in terms of product and marketing strategies development; however, in relation to the organisation of business processes (organisational culture) such a relationship is not observed. These conclusions contradict to those expressed earlier within the framework of organisational theories.

The article by Z. Li, G. Liao, and K. Albitar [38] touches upon the problems of comprehensive measurement of employees' involvement in the processes of corporate environmental responsibility to study its relationship with the firm's value. Knowledge management system is also considered as a factor in the development of corporate innovation. Using data from a sample of 496 Chinese listed companies from 2008 to 2016, it is shown that innovation plays a mediating role.

The article "A Micro-Foundations Approach to Studying Innovation in Multi-national Subsidiaries" [39] also states that the knowledge management system is a micro-foundation of innovation activity and innovation efficiency of business. The authors use the approach to human resource management, explaining the dependence of innovation and knowledge management system development on the socio-demographic characteristics of managers. Using a sample of 228 subsidiaries from 11 countries, it is demonstrated that experience in the industry gives managers the competences of working with subsidiaries.

Thus, the formal clustering of the most cited publications (6 segments), while clarifying the essence of research by means of content analysis, allowed us to establish two basic trends that define the main directions of development of knowledge management.

Firstly, it is a comprehensive blending of the basic principles and achievements of all approaches within the concept of knowledge management. Moreover, interdisciplinarity is a mandatory criterion for worthy research in this area of management. The authors a priori (antecedently) build them on the postulates that knowledge is a key factor in the development of innovation — the type of knowledge and its successful incorporation into business processes determine the competitive advantages of business.

Secondly, active study of the technological component of the knowledge management system as a key factor of its effectiveness.

It is believed that these trends will continue to increase.

CONCLUSIONS

Perspectives on the concept of knowledge management

Despite the fact that the concept of knowledge management has existed for quite a long time, as in any dynamically developing field of scientific knowledge, it has both gaps in terminology and problems related to a common understanding of the methodology of solving research problems. The search for the "right" metrics to assess the knowledge of an organisation and the impact of its level on business performance is still relevant. At the same time, a rather stable framework of theoretical approaches containing tools for analysing the processes occurring in the economic and managerial spheres of organisations' activities has been formed.

The current problematics of scientific works within the concept of knowledge management is focused on clarification of variables and factors influencing the construction and development of the knowledge management system. This is partly due to the interdisciplinary nature of research and linking of different approaches within one work: engineering, organisational psychology and sociology knowledge, resource approach, etc., and to some extent — to ambiguity in the interpretation and dual nature of knowledge as such, the properties of inseparability from the object and blurring of property rights, the essential role of the non-codifiable part, etc.

All of this, we believe, will further develop the concept of knowledge management and motivate scholars and practitioners to continue research in this area.

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Problems of Scientometrics and its Suitability for Management Scientific Activity in Modern Russia

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ABSTRACT

The purpose of the study is a critical analysis of the Russian practice of using the main indicators of scientometrics in management activities at various levels. To achieve this goal, it was necessary to solve several problems, namely: to study the main scientometric parameters; determine the degree of accuracy and reliability of information indexed by the major bibliographic databases; to formulate a number of principles of management practice related to scientometrics; to identify and consider the shortcomings of management decisions recorded in regulatory documents; to develop recommendations aimed at resolving a number of problems related to the use of scientometric indicators. The research is based on both general scientific theoretical methods: induction and deduction, analysis and synthesis, systems approach, social modeling, comparative typological and comparative analytical methods, and practical methods: working with documents, analysis of printed and electronic sources of information, content analysis and bibliographic combination of documents. In the course of the work, it was revealed that scientometrics in its applied version still clearly lacks reliability both due to imperfections associated with both its main indicators in all databases and with the indexing of publications in them, as well as due to management miscalculations reflected in regulations. In particular, in the light of the current political events caused by the special military operation in Ukraine, and in connection with difficult access to Western bibliographic data bases, the problem of a radical reorganization of the Russian Science Citation Index (RSCI) and the transition to a new system of scientometric indicators clearly arises. The data and recommendations obtained as a result of the study will help management structures avoid obvious omissions and errors in planning and monitoring the scientific activities of university and academic research institute staff, as well as optimize scientometric reporting.

Keywords: scientometrics; scientometric indicators; management principles; bibliometric databases; Scopus; Web of Science; RSCI

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INTRODUCTION

The topic of the title of the article has repeatedly attracted the attention of domestic and foreign specialists, because in recent decades, scientometrics and its indicators have been widely used in management and science policy. The scientometrics itself, which is a field of science studies, conducts the study of its object (science) by means of various measurements and statistical processing of information, primarily related to scientific literature, concentrated in bibliographic and abstract databases (BDBs). Currently, the largest of these are the American — Web of Science (WoS) and the European — Scopus. In addition, countries with a high level of scientific development sometimes form their own national databases, for example, in Russia it is RSCI — Russian Science Citation Index (RSCI). Data from these databases and scientometric indicators are widely used in making various management decisions (including funding of universities, individual scientific teams), allocating grants, concluding, or extending labour contracts, etc.

However, it should be borne in mind that the "weight" of scientometrics is not the same in different countries. For example, in the UK, USA or Germany, its role is minimal, while in

Pakistan, China, Spain and a number of other countries it is given great importance. The use of scientometrics and its indicators is often significantly influenced by the decisions of the highest political authorities and specific ministerial structures, as can be easily seen in Russia, where the influence of the state on all spheres of society has always been particularly high. This article provides a brief analysis of the application of scientometric parameters in modern management activities at various levels.

PROBLEMS OF SCIENTOMETRICS AND ITS MAIN INDICATORS

Classical scientometrics usually deals with large arrays of statistical information, when, for example, we track certain topics in scientific periodicals in bibliographic and abstract databases or calculate the impact factor of a journal for a certain period of time. In such cases, we are dealing with anonymised metadata, usually quite reliable and relatively accurate (based on the law of large numbers). In this respect, scientometrics may well claim to be considered a full-fledged scientific discipline.

On the other hand, when it comes to the scientometric indicators of an individual scientist or scientific team, we sometimes have to face big problems caused by the human factor. This can manifest itself in incomplete raw data, the use of questionable tools, various kinds of manipulations, etc. The inevitable result is the distortion of primary digital material, a matter often complicated by the incompetence of managers and the practice of indexing scientific papers in various bibliographic and abstract databases. Let us dwell on this aspect in more detail.

To begin with, for Russian managers at various levels, the source of initial digital information for planning and controlling the efficiency of scientific activity is information about authors and organisations recorded in the bibliographic and abstract databases of WoS, Scopus and RSCI. In turn, all these databases use three main indicators (in addition to several dozen other metrics): 1) number of publications; 2) number of references (citations); 3) Hirsch index (*h*-index). The author of this study has already repeatedly had to criticise these parameters in detail, and therefore this article provides only a few examples of more detailed criticism. Thus, a significant disadvantage of scientometric data can be their incompleteness associated with the principles of indexing in WoS and Scopus [1]. The fact is that they recognise only those scientific papers published in a limited number of journals selected according to strict criteria, and therefore not all articles are indexed in the above-mentioned bibliographic and abstract databases. The same remark applies to conference proceedings, reviews, and monographs, and among the latter only those published by the most authoritative Western publishers (Oxford University Press, Springer, Taylor, and Francis, etc.)[1] are taken into account. At the same time, the works published mainly in English have an unconditional priority, which results in hidden discrimination against representatives of non-English-speaking countries [2]. Now the political factor has been added: Western journals and publishers sometimes refuse to publish Russian authors because of the current political situation [3]. For example, on January 15th, 2023, the British newspaper The Guardian published a story about discrimination against the work of Russian physicists working at the Large Hadron Collider in Switzerland, as a result of which the publication of more than 70 articles in which they are co-authors was suspended [4].

As for RSCI, unlike its foreign analogues, it, on the contrary, registers not only scientific works, but also educational, methodological, reference literature, data from abstract lists,[2] and occasionally popular scientific works and

[1] Publishers. Web of Science. URL: http://wokinfo.com/mbl/publishers

[2] Elibrary.ru. URL: https://elibrary.ru/item.asp?id=20360369

grant reports,[3] as well as references to them.[4] As a result, the number of registered works in the author profile of a Russian scientist in RSCI can sometimes exceed the number of his/her genuine scientific works and be an order of magnitude higher than in Western bibliographic and abstract databases. Finally, all databases occasionally contain erroneous data related to duplication of works, their attribution to other authors, the appearance of double or even triple author profiles, etc., which distorts basic scientometric information, especially in terms of accounting for the total number of publications of a scientist [5].

It should be pointed out that the total number of works of a scientist (or a scientific team) for a certain period of time does not tell us much about their quality: it is possible to have 50 publications, including monographs and articles in highly rated journals, and the same number of publications that are only articles in second-rate periodicals, abstracts and reviews. In view of the above, a general management recommendation could be the following: **it is always necessary to achieve as much detail as possible in the scientometric indicators**. Ignoring this simple and obvious principle usually indicates either weak competence of the management at the relevant level or bias and the presence of a corruption component.

Another problem associated with the number of publications, which has an extremely negative impact on the objectivity of scientometrics, is co-authorship. The fact is that after the publication of a collective scientific work and its registration in one or another bibliographic database, all co-authors equally receive a corresponding entry in their individual profile as full-fledged creators of this work, although their real contribution may be close to zero. In 2021, a world record was set when 15,025 researchers from 122 countries in the *CovidSurg* group became authors of one scientific article [6]. Of course, in reality, all these numerous authors did not write this scientific paper, but their names were included in the author's list for one reason or another. It logically follows that such fictitious co-authorship unreasonably increases the number of publications recorded in the profile of a particular scientist in bibliographic and abstract databases. In addition, the increasing use of neural networks in the creation of scientific texts may call into question the very authorship of the work and, consequently, further distances scientometric statistics from the criteria of accuracy and reliability.

Domestic specialists have already tried to solve the problem of co-authorship by developing mathematical formulas of share participation [7, 8]. However, this is unlikely to have a positive impact on the objectivity of the final figures, because even if an article has two authors, it does not guarantee that the contribution of each of them to the creation of the text is 50%. The fact is that in real life, often one of them writes the major part (up to 80–90%), and the second one — proportionally less, and the authorial parity is clearly violated. In our opinion, it is necessary to divide all the works of the author into those written personally and those performed within a team, which will give a clear idea of the real merits of the scientist and will be an obstacle to scientometric "scoring" (artificially inflated) and parasitism through co-authorship [9].

In Russian management practice, the problem of co-authorship is usually solved simply and, one might say, formally: either by dividing the initial score for a scientific work by the number of co-authors, or (if there are many co-authors) the fractions are usually rounded up to 10% (less often — to 5% or 20%). Sometimes there is a strict limit on the number of authors for monographs — this is the case at the National Research University — Higher School of

[3] Elibrary.ru. URL: https://elibrary.ru/item.asp?id=53906328
[4] Elibrary.ru. URL: https://elibrary.ru/item.asp?id=21423279

Economics (HSE). Here, according to the order from 26.01.2023 No. 6.18.1–01/260123–9 on the establishment of academic allowances, when taking into account monographs, the number of co-authors is stipulated — no more than 4 people per book.[5] For articles another rule applies: when the number of co-authors is 5 or more, the basic amount of the publication allowance is divided by 5.[6]

Co-authorship is especially common in works on natural, technical, and medical sciences, and much less common in works on social and humanities topics. As a result, there is a significant bias in the number of publications of representatives of natural sciences (which are already many times more) and a kind of scientometric inequality, fraught with discrimination of humanities in case of undifferentiated approach to representatives of the two main spheres of modern scientific knowledge [10]. Therefore, we can formulate an indisputable managerial principle: **when analysing scientometric indicators, it is always necessary to take into account the specifics of scientific disciplines**, which, unfortunately, is regularly violated in practice, especially in technical universities [11].

THE PROBLEM OF CITATION COUNTING AND THE HIRSCH INDEX

Let us proceed to the analysis of the second main scientometric indicator — the number of references (citations) of the works of this or that author. This parameter also has many disadvantages due to the dependence on the specifics of the scientific discipline, citation traditions, etc. Although it is believed that the number of references best demonstrates the high (or, conversely, low) quality of scientific work, this is not always true. Much depends on the object of research: too narrow a topic is unlikely to yield abundant citations, despite the scientific value of a particular article or monograph. However, such moments, as a rule, are completely disregarded in management activities.

It should also be noted that the number of references can be easily manipulated, especially in so-called "citation corruption". This occurs when familiar specialists agree to cite each other's results without real need [12]. There are also opposite situations when scientists, due to personal antipathies, dislikes, aversions, or fierce competition, refuse to make references to the works of their colleagues.

Sometimes there is a political or ethnic bias — Canadian bibliometrician Yves Gengra notes that scientists of the most developed Western countries pay much less attention to journals (especially in the humanities) published in the "periphery" (which includes Russia), in fact reproducing the imperial logic of relations between the metropolis and colonial countries [13]. The inevitable consequence is an insignificant number of citations of works by "peripheral" scientists. This unfavourable trend is clearly intensifying with regard to Russian specialists after the beginning of the special military operation (SMO) and the introduction of total anti-Russian sanctions.

In conclusion of a brief review of the main scientometric indicators, let us turn to the well-known Hirsch index [14]. Being actually derived from the number of publications and their citations, the h-index has a number of disadvantages (partially mentioned above), including the possibility of its artificial increase. It is no coincidence that since the publication of this index, numerous attempts have been made to improve it, similar indicators have been developed (e.g., Leo Egge's *g*-index) [7], and some specialists both at home and abroad have proposed to abandon the use of the Hirsch index in scientometric practice. The general

[5] Regulations on Academic Allowances of the Federal State Autonomous Educational Institution of Higher Education "National Research University Higher School of Economics". CLAUSE 10.1.2. OF THE SRI HSE. URL: https://www.hse.ru/docs/810929207.html

[6] Ibidem. Clause 10.3.2.

conclusion for the manager is the following: **one cannot absolutise individual scientometric indicators**, because they are far from flawless, and therefore **a comprehensive approach is always necessary**. Although even this, it should be said, is not always able to give 100% accuracy when analysing the publication activity of an individual scientist or scientific team.

SHOULD SCIENTOMETRICS BE USED IN MANAGEMENT PRACTICE?

After this critical review of the main scientometric indicators, the reader may get the impression that the use of scientometrics to assess the effectiveness of scientific activity is completely useless. In fact, such a conclusion was reached in the UK, when the opinion about the viciousness of scientometric metrics was confirmed in the management structures supervising science. Accordingly, in 2014, the *Research Excellence Framework* (REF) system was introduced in the country to analyse the state of local universities with the absolute priority of expert assessments [15]. Moreover, in 2015, scientometrics experts themselves, aware of the imperfections of the scientometrics toolkit, issued the so-called "Leiden Manifesto", which stated that the quantitative analysis of scientific publications should only complement the qualitative, expert assessment and contained recommendations to expand the range of scientometrics indicators, their periodic critical discussion and revision [16].

Indeed, there is an urgent need to improve tools and metrics, but, on the other hand, it is hardly worth relying solely on expert opinion. The important fact here is that any scientific article or monograph before publication must undergo an external independent review, i.e., basically the same expertise. Additional evaluation by a specialist is not always the best option, because much depends on the subjective factor — the possible bias of the expert for one reason or another (in particular, due to adherence to a particular theory or scientific school) or on his/her competence. In addition, there is a problem of possible significant variation of expert opinions [17]. It remains to add that expert judgement usually takes much longer than the calculation of scientometric indicators and statistics, and sometimes requires significant financial costs.

Summarising the preliminary results, it should be emphasised that, despite all the imperfections of scientometrics and the shortcomings of its indicators, it is impossible to abandon them, because **without knowledge of the basic, even the most primitive scientometric parameters, it is impossible to assess the scientific achievements of any scientist or team**. Otherwise, how can we judge the professional performance of the author, if we do not know, for example, the total number of his publications? Therefore, we should try to use scientometric data and tools in the most efficient way and achieve the highest possible accuracy of the final indicators.

USE OF SCIENTOMETRICS AND ITS INDICATORS IN THE MANAGEMENT OF RUSSIAN SCIENCE AT THE FEDERAL LEVEL

The first attempt to introduce statutorily scientometric indicators in Russia was made in 2006, when the Ministry of Education and Science, the Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences (RAS) issued a joint order on the regulation of incentive payments for employees of their respective departments.[7]

[7] Order of the Ministry of Education and Science of the Russian Federation, the Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences of 3.11.2006 No. 273/745/68 "On Approval of Types, Procedure and Conditions of Application of Incentive Payments Ensuring Improved Performance of Scientific Workers and Heads of Scientific Institutions and Scientific Workers of Scientific Centres of the Russian Academy of Sciences". URL: https://www.garant.ru/products/ipo/prime/doc/90338/

This document defined the criteria for individual research performance indicators (IRPIs) for representatives of academic research institutes and university teaching staff (the faculty).

The individual research performance indicators can be represented as the sum of these indicators with weighting coefficients taken into account:

$$IRPI = kJ + pMU + hD + sK + bP + gR + C,$$

where J — is the number of publications in journals; MU — number of monographs and textbooks; D — sum of reports at conferences; K — number of scientific and educational courses; P — number of patents; R — quantitative parameter related to scientific supervision; C — number of references to the author's works for the reporting period of time; k, p, h, s, b, g — weighting coefficients.

It is hardly expedient to analyse this formula in detail, because its detailed criticism is contained in the articles by I. D. Kotlyarov [18, 19]. Only two points should be noted: 1) it was impossible to include textbook writing, development of scientific-educational courses, and scientific supervision as part of scientific activity, since this refers to teaching and methodological, educational, methodological, and pedagogical practice; 2) the use of the weighting coefficients recommended in the Order leads to bias, in particular, direct or hidden discrimination of monographs, foreign publications and works on humanitarian topics [11]. Although the above-mentioned Order[8] was later cancelled, many of its provisions are still present in one form or another in many evaluation regulations of universities and academic research institutes.

In 2009, the Ministry of Education and Science of the Russian Federation attempted to further stimulate the publication activity of Russian scientists by issuing Order No. 406 dated 14.10.2009 together with an annex to the standard methodology of individual research performance indicators (IRPI),[9] which outlined the criteria by which scientific institutions should report. The new regulatory document partially contained the shortcomings of the previous order of 2006, and also contained a number of new ones, which testified to the insufficiently high professional level of the management staff of the Ministry of Education and Science of the Russian Federation [20]. Nevertheless, the Presidium of the Russian Academy of Sciences in the resolution of 12.10.2010 No. 201 confirmed the main provisions of this document, adding RSCI as one of the sources of control scientometric information to assess the performance of academic research institutes' employees.[10]

However, all normative acts of state bodies since 2006, as well as subsequent bylaws (secondary legislation) and orders of ministries, universities and research institutes of the Academy of Sciences have not really brought significant changes that could radically stimulate the ac-

[8] Order of the Ministry of Education and Science of the Russian Federation No. 1, Ministry of Health and Social Development of the Russian Federation No. 1H, RAS No. 1 of 11.01.2010 "On invalidation of the Order of the Ministry of Education and Science of the Russian Federation, Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences of 03.11.2006 No. 273/745/68 "On approval of types, procedure and conditions of application of incentive payments ensuring the improvement of performance of scientific workers and heads of scientific institutions and scientific workers of scientific centres of the Russian Academy of Sciences". URL: https://normativ.kontur.ru/document?moduleId=1&documentId=151080

[9] Order of the Ministry of Education and Science of the Russian Federation No. 406 of 14.10.2009 "On Approval of the Standard Regulations on the Commission for the Assessment of the Performance of Scientific Organisations Performing Research, Experimental Design and Technological Works of Civil Purpose and the Standard Methodology for the Assessment of the Performance of Scientific Organisations Performing Research, Experimental Design and Technological Works of Civil Purpose". URL: https://www.garant.ru/products/ipo/prime/doc/97371/

[10] Resolution of the Presidium of the Russian Academy of Sciences "On Approval of the Provision on the Commission for Performance Evaluation of Scientific Organisations of the Russian Academy of Sciences and the Methodology for Performance Evaluation of Scientific Organisations of the Russian Academy of Sciences". URL: https://www.ras.ru/presidium/documents/directions.aspx? ID=9767952e-4821–4510–89d6–5f678677066d

tivity of domestic scientists. As a result, Russia occupied increasingly low places in international rankings, which primarily recorded scientific periodicals indexed in leading international bibliographic and abstract databases [21]. The matter has moved from the dead point only after the Decree of the President of the Russian Federation Vladimir Putin "On measures to implement the state policy in the field of education and science".[11] The document envisaged an increase in the share of Russian researchers' work in the total number of publications in the world's scientific journals indexed in the Web of Science bibliographic and abstract databases to 2.44% by 2015 and the inclusion of at least five Russian universities in the top 100 leading world universities according to the international university ranking by 2020. Accordingly, an ambitious government programme "5–100–2020"[12] was adopted in 2013, along with a sharp increase in funding for the country's leading research universities.

The promulgation of the Decree was a decisive step towards the total use of scientometrics in management practice and the application of scientometric indicators in universities and institutes of the Russian Academy of Sciences system [22]. In September 2014, it was possible to conclude an agreement to place the best Russian journals from RSCI on the WoS platform in the form of a separate RSCI WoS database [23]; however, domestic publications selected in the new database are not taken into account when calculating such metrics as impact factor and *h*-index in the "core" bibliographic and abstract databases of WoS (Web of Science Core Collection, WOSCC). Therefore, articles and reviews in journals from the RSCI WoS list are not considered by managers supervising science as equivalent to publications in WoSCC or Scopus, which was confirmed by the official letter of the Ministry of Education and Science of the Russian Federation from 26.12.2016 No. 14–2201.[13]

In general, measures and requirements of state structures to increase the publication activity of universities and academic research institutes with certain financial incentives have had a noticeable positive effect: for several years there has been a significant increase in Russian articles registered in all bibliographic and abstract databases; especially many publications belonged to universities participating in the Programme "5–100–2020" (although it was never implemented) [24]. At the same time, excessive administrative pressure to increase the quantity and quality (at the expense of publications in journals of 1–2 quartiles registered in bibliographic and abstract databases of WoS and Scopus) led to the emergence of a number of negative phenomena in the Russian scientific community, among which the increase in fictitious international collaborations and the growth of artificial co-authorship represented the "lesser of evils". Much more severe consequences were the expansion of the practice of duplication of publications, publication of articles in the so-called "predatory" journals (they are characterised by payment for publications in the absence of real peer review), participation in low-quality ("rubbish/junk") conferences, along with the increase in "citation corruption" [25–27]. In many respects, this was the result of violation of the managerial

[11] Decree of the President of the Russian Federation from 07.05.2021 No. 599 "On measures to implement the state policy in the field of education and science". URL: http://www.kremlin.ru/acts/bank/35263

[12] Resolution of the Government of the Russian Federation of 16.03.2013 No. 211 "On measures of state support for leading universities of the Russian Federation in order to increase their competitiveness among the world's leading scientific and educational centres". URL: http://publication.pravo.gov.ru/Document/View/0001201303200001

[13] Letter of the Ministry of Education and Science of the Russian Federation dated 26.12.2016 No. 14–2201 "On achieving the value of the indicator "Share of publications by Russian researchers in the total number of publications in the world's scientific journals indexed in the database "Web of Science" (Web of Science)". URL: https://base.garant.ru/71622282/

principle of **proportionality of workload and staff capabilities**. At the same time, one of the scientometric consequences of the "conference explosion" and "citation corruption" was a sharp jump in the Hirsch index of unscrupulous authors in the bibliographic and abstract databases of Scopus and WoS; as for RSCI, this was reflected, in particular, in such a metric as the RSCI core percentile.

Such phenomena have become a consequence of one of the "managerialism traps". Its essence lies in the fact that almost all scientometric indicators were formed (and are still being formed) at the upper levels of the management vertical without taking into account the opinions of academic staff, faculty and employees of academic research institutes, who have to adjust their activities to various control (and often quite arbitrary) figures sent down from "above" [28].

The "managerialism trap" showed itself very clearly at the federal level in January 2020, when, in an effort to further stimulate the publication race among institutes of the Russian Academy of Sciences, the Ministry of Education and Science sent out a directive letter "On the adjustment of the State Assignment taking into account the methodology for calculating the integrated score of publication performance".[14] It proposed to calculate the efficiency of scientific work according to a complex integral formula based on the points gained primarily for scientific publications. The benchmark figures were placed in a table, the analysis of which shows that the ministerial requirements for scientific metrics have reached a complete absurdity: one article published in a journal of the first quartile (Q1) of WoS was equated to 20 articles registered in bibliographic and abstract databases of Scopus (regardless of quartiles!) or 40 articles of Russian journals from the list of the State Commission for Academic Degrees and Titles, or 20 monographs! But the labour and time required to write even a small monograph is not comparable to that required to prepare even the highest quality article. At the same time, the one-sided orientation to bibliographic and abstract databases of Web of Science meant an extreme degree of discrimination for humanities scholars, as it became impossible for them to receive high scores for their scientific work. The fact is that the overwhelming majority of the most authoritative journals on humanitarian topics have no impact factor calculation in WoSCC, hence, no quartile. In this case, the humanities could not be helped by publications in journals registered in the bibliographic and abstract databases of Scopus or RSCI WoS, as they were awarded, respectively, only 1 and 0.75 points per article [11].

Naturally, the publication of the ministerial letter led to violent protests by representatives of academic institutions of the Russian Academy of Sciences specialising in humanitarian issues. As a result, on 25 August 2020 the Ministry of Science and Higher Education adopted a new procedure for the methodology of calculating points for representatives of social and humanities sciences in the form of a separate table.[15] According to this document, all journal publications, regardless of quartiles, were rated at 3 points, and the points for monographs were calculated in author pages (1 a.p. = 40,000 characters). Although the amendments made to the methodology regarding the calculation of points for socio-humanitarian publications largely mitigated the absurdity of the indicators and the discrimination of humanitarians in the original table, several issues remained unresolved. In

[14] Letter of the Ministry of Science and Higher Education of the Russian Federation from 14.01.2020 No. MN-8/6-SK "On the adjustment of the state assignment taking into account the methodology for calculating the complex score of publication performance". URL: https://docs.cntd.ru/document/564894817

[15] Methodology for calculating the qualitative indicator of the state task "Comprehensive score of publication performance" for scientific organisations subordinated to the Ministry of Science and Higher Education of the Russian Federation for 2020. URL: https://minobrnauki.gov.ru/documents/?ELEMENT_ID=24754&sphrase_id=20352

particular, it is unlikely that the quartile metric should have been abandoned (at least for journals indexed in the bibliographic and abstract databases of Scopus), since otherwise representatives of social and humanities disciplines lose the incentive to publish their work in highly rated journals. It is probably worth maintaining some differentiation in the assessment of publications published abroad and indexed in bibliographic and abstract databases of WoS and Scopus, on the one hand, and RSCI WoS on the other hand.

THE IMPACT OF FOREIGN POLICY ON SCIENTOMETRIC PRACTICE

It has been about two years since the January 2020 Ministerial Letter was made public, when the Special Military Oreration, which began in February 2022, made its own adjustments to the government's scientific policy regarding the use of scientometric parameters. The fact is that in the course of the collective West's imposition of unprecedented sanctions against Russia, both leading international bibliographic and abstract databases (WoS and Scopus) announced in March 2022 that they would not cooperate with Russian scientific and educational organisations. In response, on 19 March the Chairman of the Russian government M. V. Mishustin signed a decree "On Some Issues of Application and Requirement of Target Values of Indicators Related to Publication Activity", according to which until 31.12.2022 the rule according to which Russian authors were obliged to have publications in editions indexed in bibliographic and abstract databases of Scopus and WoS when defending theses and dissertations, receiving grants, etc., was cancelled. Later, by order of the head of the Ministry of Education and Science V. Falkov introduced an amendment extending the validity of this decree until 31.12.2023.[16]

Since the role of international bibliographic databases in Russia has significantly decreased, it was decided to partially replace their data with domestic indicators. At the end of 2022, the Higher Attestation Commission (State Commission for Academic Degrees and Titles) under the Ministry of Education and Science of the Russian Federation approved the list of journals,[17] for which 2,587 Russian periodicals were selected, divided into three categories in descending order of the integral rating indicator. The first category (K1) included 25% of highly rated journals, the second category included lower rated journals (K2) — 50%, and the third category (K3) — the remaining 25%. Now, according to the new requirements of the State Commission for Academic Degrees and Titles, PhD students in biological, geographical, physical-mathematical and chemical branches of science need to publish at least two articles, one of which — in the publications of category K1 or K2, or registered in RSCI WoS. In the humanities and other sciences, three articles, two of which are not including the new categories. Doctoral candidates in the Humanities or Social Sciences must publish at least 15 articles, five of which must be published in the editions or publications either classified as K1 or K2 or listed in the WoS RSCI. For other branches of science — at least 10 articles, five of which should also be published in the above categories. Thus, a not unreasonable question arises: on what grounds is the scientometric discrimination of representatives

[16] Order of the Ministry of Science and Higher Education of the Russian Federation of 03.11.2022 No. 1071 "On Amending the Order of the Ministry of Science and Higher Education of the Russian Federation of 06.05.2022 No. 442 "On non-application of certain provisions of some acts of the Ministry of Science and Higher Education of the Russian Federation in terms of requirements and target values of indicators related to publication activity"". URL: http://publication.pravo.gov.ru/Document/View/0001202212060038

[17] Letter of the Higher Attestation Commission of the Ministry of Education and Science of Russia from 06.12.2022 No. 02–1198 "On the List of peer-reviewed scientific publications" (together with "Distribution of journals included in the list of peer-reviewed scientific publications, in which the main results of dissertations for the degree of candidate of sciences, degree of doctor of sciences should be published by category"). URL: https://sudact.ru/law/pismo-vak-minobrnauki-rossii-ot-06122022-n/

of humanities disciplines continuously being repeated and will this end?

The above examples show that decisions taken at the federal level often provoke various negative phenomena, ranging from encouraging artificial co-authorship, "citation corruption", publications in "predatory" and "rubbish/junk" publications to social discontent up to open protests, as it happened after the publication of the ministerial letter in 2020. It is relevant to recall that the use of the imperfect individual research performance indicators (IRPIs) system in its time (2006) generated acute conflict situations in some scientific teams [29]. In light of the above, it is obvious that it is necessary to take certain organisational measures at the federal level in order to solve the accumulated problems and prevent the repetition of managerial errors in the use of scientometrics and its indicators.

APPLICATION OF SCIENTOMETRICS IN UNIVERSITY AND INSTITUTE PRACTICE

The situation at the level of universities and academic institutions can be called ambiguous. A kind of "scientometric anarchy" reigns here, when the administration of each educational or research organisation forms its own set of requirements for scientometric indicators. Several years ago, the author of this article already had to touch upon this topic [20], and a review of several dozens of normative acts and regulations of universities and academic research institutes for 2020–2023 showed that no significant and positive changes in the regulatory framework (in which management decisions are recorded) have occurred.

Let us start with the problem that has long required managerial optimisation, namely, the "embedding" of scientific work in the general point reporting, which also includes assessments of pedagogical, methodological, organisational, and educational activities. It should be noted that there are noticeable distortions and omissions here. The reasons for this lie in the 2006 order and the formula of individual research performance indicators. For example, in this document there is a point related to scientific supervision of postgraduate students — it (as it was mentioned above) cannot be attributed to scientific work in the strict sense of the word, but should be attributed to methodological and pedagogical activity. However, the drafters of the order ignored this obvious fact. Scientific supervision itself is described in Section 2.1.6 of this document: "For the supervision of a candidate for a degree who has defended a candidate's thesis, a score of 30 points is set for the scientific supervisor".[18] For comparison: the same 30 points according to the formula of individual research performance indicators could be obtained for a monograph of 15 authored pages. However, it is obvious that it is much more difficult to write it than to supervise an intelligent postgraduate student. What was the reason for such high scores for scientific supervision in the 2006 order? Obviously, it was not so much a concern for improving the human resources potential of domestic science, as it was to provide top university official and functionaries, who usually have several postgraduate students, with high final scores and, accordingly, cash payments. These large (and unreasonable) accruals of points for scientific supervision recommended by the order are still present in the normative regulations of a number of higher educational institutions. For example, in the Regulations on the rating system for assessing the quality of OmSTU (Omsk State Technical University) employees' performance, adopted at the meeting of the Academic Council

[18] Order of the Ministry of Education and Science of the Russian Federation, the Ministry of Health and Social Development of the Russian Federation and the Russian Academy of Sciences of 3.11.2006 No. 273/745/68 "On Approval of the Types, Procedure and Conditions of Application of Incentive Payments Ensuring Improved Performance of Scientific Workers and Heads of Scientific Institutions and Scientific Workers of Scientific Centres of the Russian Academy of Sciences". Section 2.1.6. URL: https://www.garant.ru/products/ipo/prime/doc/90338/

of this university on 31.03.2023 (Minutes No. 4), an employee is entitled to only 13 points for publishing a monograph, while for scientific supervision of a defended PhD student — as much as 45 points (i.e., almost 3.5 times more).[19]

At the same time, there is no doubt that it is scientific work, rather than methodological or educational work, that should be prioritised based on its complexity. Not everyone can successfully engage in highly intellectual, creative activities aimed at obtaining, understanding, and systematising new scientific information, as they require the highest professional qualifications, extensive knowledge, and creativity. In practice, the managerial principle that **work should be rewarded in proportion to its complexity and quality** is constantly violated. Let us take a specific example: in the Regulations on the performance indicators of the Novosibirsk State Agrarian University, the faculty members were entitled to 100 points just for writing an application for a grant of international level — as for 10 monographs or almost half of an article published in the Q1 journal (WoS/Scopus).[20]

Another example: according to the Regulations on the organisation of rating of the teaching staff of the Plekhanov Russian University of Economics, approved by the Academic Council in 2023,[21] a representative of the university's teaching staff received 4 points for a monograph, textbook or manual in Russian, and the same number of points for preparing a team to participate in student competitions (international/all-Russian level, inter-university, intra-university stage, pre-final stages), and almost the same number of points — 3 points — for being a member of the admissions committee for at least 22 days on end or more.[22] But it is obvious that being a member of the admissions committee for 1–2 months or preparing students for competitions are much easier than writing a scientific book.

Thus, contrary to elementary fairness, in many regulations of higher education institutions scientific work has no preferences compared to other types of teaching activity. Apparently, the strength of the traditions of the Soviet higher school, where scientific work was given only the third place after academic and methodological work, continues to have an effect. At that time, abstracts of reports made at local conferences were recognised as quite worthy publications, because in the USSR it was believed that scientific work should be carried out not by universities (as in the West), but by institutes of the Russian Academy of Sciences system. In the USA, on the contrary, there is a clear pattern — the higher the university category and its reputation, the more attention is paid to the scientific activity of the teaching staff [30]. Of course, one should not go beyond common sense in this matter, as excessive attention to publication activity may lead to the fact that the representatives of the teaching staff start to neglect their main function — teaching activity [31].

In addition to this problem, there is another one, which is the lack of a common orderly scale of evaluation of scientific publications, which manifests itself in the accrual of points for the

[19] Regulations on the rating system of quality assessment of OmSTU employees' performance FSAEI HE "Omsk State Technical University", Minutes No. 4 of 31.03.2023. URL: https://omgtu.ru/educational_activities/dokumenty_smk/Pologeniya/%D 0%9F%D 0%BB%D 0%B 6_%D 0%9E_%D 1%80%D 0%B 5%D 0%B 9%D 1%82%D 0%B 8%D 0%BD%D 0%B 3%D 0%BE%D 0%B 2%D 0%BE%D 0%B 9_%D 1%81%D 0%B 8%D 1%81%D 1%82%D 0%B 5%D 0%BC%D 0%B 5_%D 0%BE%D 1%86%D 0%B 5%D 0%BD%D 0%BA%D 0%B 8_%D 1%80%D 0%B 0%D 0%B 1%D 0%BE%D 1%82%D 0%BD%D 0%B 8%D 0%BA%D 0%BE%D 0%B 2.pdf

[20] Regulations on the organisation of the educational process. Minutes 1. NSAU (official website). URL: https://nsau.edu.ru/directory/lokalnye-normativnye-akty/

[21] Regulations on the organisation of rating of pedagogical staff of basic general and secondary general education of G.V. Plekhanov Russian State Budgetary Educational Institution of Higher Education (approved by the decision of the Methodological Council No. 3-OH dated 4.11.2023). URL: https://www.xn — p1ag3a.xn — p1ai/~file/85931/%D 0%A0%D 0%B 5%D 0%B 3%D 0%BB%D 0%B 0%D 0%BC%D 0%B 5%D 0%BD%D 1%82+%D 0%A0+%D 0%9E%D 0%9E%D 0%9E+%D 0%B 8+%D 0%A1%D 0%9E%D 0%9E+%D 0%BE%D 1%82+17.11.2023.pdf.

[22] Ibidem, paragraphs 1.2.1, 1.10.3, 1.13.1.

same type of printed works. For example, in the evaluation regulations of some universities the score for publishing a monograph and/or textbook is fixed as a constant value, in others the score is multiplied by the number of printed (or author's) pages, and in others — monographs have some point preferences, although mostly insignificant. At the same time, in a number of universities, such as Plekhanov Russian Economic University (as mentioned above), there is no differentiation between monographs and textbooks in the regulatory documents.

Again, the requirement of regulations applied in several universities and academic research institutes to have a minimum print run or circulation of 100 to 500 copies looks archaic in view of the transition of some scientific publications entirely to digital format.

In the West, the print run/circulation of a book is never specified, as it is considered a trade/commercial secret by the publisher; moreover, as orders come in (now via the Internet), there may be periodic reprinting of the original print run. In Russia it reaches the point of absurdity. For example, the latest edition of the rating system for evaluating the performance of teaching staff at Orenburg State University states that 20 points (divided by the number of co-authors) are awarded for publishing monographs, collections of scientific papers affiliated with OSU and having a volume of more than 300 pages, and only 10 points if the volume is less than 300 pages.[23] The chosen criterion is rather dubious: if a book has 299 pages, it will get only 10 points, and if it has 301 pages, it will get twice as many. It is difficult to understand why the number of pages is the measure of scientific significance, especially since their number directly depends on the font size and format of the publication, which has nothing to do with science.

In addition to the fact that a significant difference in the evaluation of scientific publications (partly in terms of their nomenclature and other indicators) exists between different universities and academic research institutes, it is sometimes present even in the regulatory framework of a particular university or institute of the Russian Academy of Sciences. First of all, it is worth mentioning once again the unprecedented, overestimated prestige of articles, especially those of the 1st-2nd quartile, published in journals indexed in bibliographic and abstract databases of WoS/Scopus. Probably, many Russian universities, by giving clear preference to such articles, hope to increase or maintain their place in international university rankings, which take into account data from foreign bibliographic and abstract databases with their emphasis on registration of primarily scientific periodicals. For example, in the Regulations on the rating assessment of the quality of Omsk State Technical University employees' performance, 150 points were given for an article of the 1st-2nd quartiles (WoS/Scopus), but only 13 points for a monograph (just like for an article in the RSCI WoS journal).[24]

However, recently, due to the current political situation, some universities have already abandoned Western metrics and switched to domestic indicators. For example, in the Regulation on the rating assessment of faculty performance adopted at Voronezh State Technical University, articles in journals of 1–2 quartiles are not mentioned at all, but there are publications of the State Commission for Academic Degrees and

[23] Regulations on the rating system of evaluation of pedagogical staff related to the teaching staff dated 04.04.2022 No. 62-D, with amendments No. 1 dated 04.04.2023. paragraph 8. URL: http://www.osu.ru/doc/4701

[24] Regulations on the rating system of quality assessment of OmSTU employees' performance. Approved by OmSTU order from 01.07.2022 No. 653. URL: https://xn — c1arfsf.xn — p1ai/educational_activities/dokumenty_smk/Pologeniya/%D 0%9F_%D 0%9E%D 0%BC%D 0%93%D 0%A2%D 0%A3_%D 0%9E_%D 1%80%D 0%B 5%D 0%B 9%D 1%82%D 0%B 8%D 0%BD%D 0%B 3%D 0%BE%D 0%B 2%D 0%BE%D 0%B 9_%D 1%81%D 0%B 8%D 1%81%D 1%82%D 0%B 5%D 0%BC%D 0%B 5_%D 0%BE%D 1%86%D 0%B 5%D 0%BD%D 0%BA%D 0%B 8_%D 0%BA%D 0%B 0%D 1%87%D 0%B 5%D 1%81%D 1%82%D 0%B 2%D 0%B 0_%D 1%80%D 0%B 0%D 0%B 1%D 0%BE%D 1%82%D 0%BD%D 0%B 8%D 0%BA%D 0%BE%D 0%B 2.pdf

Titles in three categories with the corresponding points: K1–30 points, K2–20 points, K3–10 points.[25] Other universities retain a mixed way of recording articles, i.e., both those indexed in bibliographic and abstract databases of WoS/Scopus, and publications according to the State Commission for Academic Degrees and Titles K1–3, as, for example, in the Dagestan State Pedagogical University.[26]

In addition to various kinds of publications, which usually act as the most significant indicators of scientific activity, the regulations of universities and academic research institutes also include other types of scientific activity. There is no uniformity in the evaluation criteria here either — just consider the issue of scoring of conferences, which are usually divided into Russian and international. It can be added that in practice in our country the transformation of a conference into an international one is achieved by inviting colleagues from Belarus, Kazakhstan, and other CIS countries (often in an extramural/distance format). Apparently, some additional amendments and restrictions should be made to this issue as well.

To conclude the discussion on the use of scientometric indicators in the normative developments of Higher Education Institutions and academic research institutes, let us touch upon the Hirsch index, the value of which (in points) is occasionally recorded in the scientometric reporting of individual universities, and sometimes in a rather peculiar way. For example, in the Regulations on the rating system of evaluation of teaching staff, approved by the Academic Council of Samara State Technical University on 25 November 2022 (Minutes No. 4),[27] the number of points awarded is equal to the Hirsch index according to Scopus and RSCI without any differentiation (WoS data are not taken into account). This approach can hardly be called correct, if we remember the principle of indexing in these databases (as discussed at the beginning of the article). In addition, the Hirsch index as a relatively stable value should be taken into account not in current reporting, but in qualification documents related to employment or when prolonging a labour contract.

CONCLUSIONS

By and large, it is possible to analyse for a long time the inherent imperfections and errors related to scientometric indicators in the regulatory bases of domestic universities and academic research institutes.

As a brief analysis of this topic has shown, scientometrics in its applied version still clearly lacks reliability both because of deficiencies related to its main indicators in all bibliographic and abstract databases and the indexing of publications in them, and because of managerial miscalculations reflected in normative acts. At the same time, the impact of administrative policies has directly affected the development of science itself in both positive and negative ways. Thus, on the one hand, the flow of Russian scientific publications has grown significantly in recent years, although the country is still not among the top ten countries in terms of publication activity, ranking only 12th in the SJR ratings (Scimago Journal and Country Ranks).[28] On the other hand, the forced introduction of scientometric indicators combined with excessive administrative pressure, initiating a formal increase in the number of publications and citations, led to a sharp increase in artificial co-authorship, "citation corruption", an increase in

[25] Regulations on the rating assessment of teaching staff performance dated 29.07.2023. URL: https://cchgeu.ru/upload/iblock/071/uzdyyb6txrt5xbir5p42oaktxum4965z/Polozhenie-o-reytingovoy-otsenke-deyatelnosti-PPS.pdf

[26] Regulations on the rating system for assessing the effectiveness of the teaching staff (Order of 31.01.2023, Minutes No. 5). URL: https://dspu.ru/000/dok/230231-pol-reiting-pps.pdf

[27] Provision on the rating system for evaluating the performance of the teaching staff of Samara State Technical University. URL: https://samgtu.ru/uploads/documents/polojenie/P-789.PDF?ysclid=lsu397kjbg948026639

[28] Scimago Journal & Country Rank. URL: https://www.scimagojr.com/countryrank.php

the number of materials in "predatory" journals and participation in "rubbish/junk" conferences. There was a deformation of the evaluation of scientific works with the absolutisation of journal articles indexed in foreign databases, the logical consequence of which was discrimination against monographs and, accordingly, a decrease in the number of published scientific books. Thus, at the M.V. Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences there were more than twenty monographs published in 2006, and in 2019 — only two monographs were published [32].

Special military operation entailed sanctions of the collective West, including in the sphere of access to scientometric information, concentrated in foreign bibliographic and abstract databases, which in turn led to a gradual transition to domestic indicators (implementation of the categories of K1-K3 journals proposed by the State Commission for Academic Degrees and Titles). However, it will be quite difficult to replace foreign bibliographic and abstract databases that sabotage cooperation with Russia by establishing a full-fledged scientometric assessment of Russian authors' works without a qualitative reorganisation of RSCI. For this purpose, first of all, the state control over RSCI should be established, duplicate and unreliable data should be removed from author profiles, as well as all pseudoscientific information and references to methodological literature, school textbooks, etc., leaving only monographs, theses, dissertations, scientific reports and articles from a strictly limited range of journals and conferences, following the example of Scopus and WoS. And to record the works of Russian scientists published in foreign editions and their citations, it is necessary to involve the global search engine Google Scholar with mandatory filtering of unreliable data found in it. This seems to be the only possible way, as it is unlikely that in the near future it will be possible to establish the same old relations with the West, including due to the ever-increasing divergence in the basic value attitudes.

In order to improve the situation, a number of management principles discussed in the article should be followed and several theoretical and applied problems should be solved, without which scientometrics cannot serve as a reliable support in the management of scientific activity. In the author's opinion, if properly applied and impartially taken into account, the reliable scientometric indicators and this discipline can become one of the barriers to the violation of scientific ethics and social justice in personnel matters, bonuses, grants or the awarding of honorary degrees and academic titles. The need for a comprehensive study on the use of scientometric assessments and indicators in various Russian universities and academic research institutes of the Russian Academy of Sciences on a national scale is long overdue.

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ORIGINAL PAPER

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Features of the Implementation of the Concept of Managing Decent Work Conditions at Small and Medium-Sized Enterprises in the Construction Industry

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ABSTRACT

In modern conditions, the development of any industry directly depends on the provision of highly qualified labor resources. Due to the constant shortage of personnel, it is important for employers to implement systematic measures to attract, retain and optimally use the required specialists of various qualifications. It is these tasks that the enterprise solves when organizing personnel work in accordance with the basic principles and ideas of decent work. The construction industry in the Russian Federation is one of the most dynamically developing, making a significant contribution to the country's GDP, but companies from this sector are faced with a global shortage of both labor and highly qualified specialists. It should also be noted that this sector is considered to be one of the most hazardous, injury-prone and requiring increased attention to occupational and labor safety. The purpose of the study is to identify a set of external and internal factors that determine the features of decent work management at enterprises in the construction industry. To achieve this goal, the methods of interdisciplinary analysis of scientific literature and the regulatory framework, economic analysis and analytical statistics were used. The application of counter modeling made it possible to decompose the theoretical model of decent work management and highlight the real conditions of the production, financial and socio-economic activities of enterprises in the construction complex. The results of the study are related to identifying the role of government policy, the labor market, general trends in the construction industry, vocational professional education, as well as personnel policies within the organization in the process of implementing the concept of decent work. The conclusions drawn may be of interest to managers of construction companies, and human resources and personnel management services for analyzing their own practices and carrying out measures to introduce the principles of decent work at individual enterprises in this economic sphere.

Keywords: sustainable development; sustainable development indicators; decent quality of working life; decent work conditions management; external and internal factors of decent work

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INTRODUCTION

The construction industry in the Russian Federation is among the most dynamic and successful sectors of the national economy. Its contribution to GDP in 2022 amounted to 0.5%; 10% more construction projects were commissioned than in 2021. Programs are being launched to modernize communal infrastructure, improve public spaces, work is underway to provide infrastructure budget loans and improve the mortgage lending policy.[1] All of the above allows us to consider the construction macro-sector as the most important consumer of labor resources of the state, making a significant contribution to the achievement of socio-economic sustainability of the entire country.

One of the significant problems of the industry is a pronounced deficit of both labor force and highly qualified specialists. This situation is caused by internal structural changes in the country, peculiarities of migration policy and general shortage of human resources in regional labor markets. In this regard, it is important to raise the issue of attracting workers to the industry, as well as retaining and retaining personnel at enterprises of the construction sector primarily through the implementation of the principles of decent work and maintaining a high quality of labor life of employees.

LITERATURE REVIEW

Sustainable development of modern socio-economic systems is based on the optimal use of human capital. This resource is the key indicator of economic development, and its anthropocentricity becomes the most important feature of the state personnel policy [1].

The concept of sustainable development as the main direction of the long-term economic strategy was adopted in the Russian Federation in 1996. The goals of sustainable development are integrated into the state policy and enshrined at the level of legislative and normative legal acts, the main of which is the Decree "On National Goals and Strategic Objectives of Development of the Russian Federation for the period until 2024",[2] most of them, directly related to ensuring decent work conditions, are included in the most important conventions and programmes of the International Labour Organization (ILO) — "On Social Justice",[3] "On the Future of the World of Work",[4] "Declaration on the Fundamental Principles of Decent Work".[5] The ILO documents have been ratified in Russia and serve as global benchmarks for such national projects as "Demography",[6] "Labor Productivity",[7] "Health Care",[8] "Education".[9]

When considering the factors that determine decent work, it is necessary to reflect the

[1] Marat Khusnullin summarized the results of the year at the meeting of the Presidium of the Government Commission for Regional Development. 29.12.2022. URL: http://government.ru/news/47468/ (accessed on 27.06.2023).

[2] Presidential Decree No. 204 of 07.05.2018 "On National Goals and Strategic Objectives for the Development of the Russian Federation for the Period until 2024". URL: https://rg.ru/documents/2018/05/08/president-ukaz204-site-dok.html (accessed on 12.06.2023).

[3] ILO Declaration on Social Justice for a Fair Globalization. Adopted by the International Labor Conference at its 97th Session, Geneva. 10.06.2008. URL: https://www.un.org/ru/documents/decl_conv/declarations/pdf/fair_globalization.pdf (accessed on 27.08.2023).

[4] ILO Declaration on the Future of the World of Work. International Labor Conference. URL: https://www.ilo.org/wcmsp5/groups/public/—-ed_norm/—-relconf/documents/meetingdocument/wcms_715175.pdf (accessed on 27.08.2023).

[5] ILO Declaration on Fundamental Principles and Rights at Work. Adopted by the General Conference of the International Labour Organization at its 86th session, Geneva. 18.06.1998. URL: https://www.un.org/ru/documents/decl_conv/declarations/ilo_principles.shtml (accessed on 27.08.2023).

[6] National project "Demography". Ministry of Labor of Russia (official website). URL: https://mintrud.gov.ru/ministry/programms/demography (accessed on 28.03.2024).

[7] National Project "Labor Productivity". Ministry of Economic Development of the Russian Federation (official website). URL: https://www.economy.gov.ru/material/directions/nacionalnyy_proekt_proizvoditelnost_truda/ (accessed on 28.03.2024).

[8] The National Health Care Project. URL: https://национальныепроекты.рф/projects/zdravookhranenie (accessed on 28.03.2024).

[9] National Project "Education". Ministry of Education of Russia (official website). URL: https://edu.gov.ru/national-project/about/ (accessed on 28.03.2024).

relationship of its parameters with the quality of labor life [2]. O.V. Zonova understands the latter as such a set of conditions, organization and labor protection, which leads to the maximum development of human capital of the organization and "which cannot be realized in full if working conditions do not meet the safety requirements, create a threat to the preservation, maintenance of working capacity and professional activity" [3]. The authors of studies on this topic name career development, medical care, the system of professional training and staff development, psychological climate, etc. as the most important components of the quality of working life, in addition to working conditions and organization of work. [4].

L.G. Milyaeva separates the concepts of "quality of working life" and "decent quality of working life" (DQWL), integrating the latter specifically into the concept of management of decent work conditions [5]. In her opinion, the functionality of DQWL should consist of the following functions:

- stimulating, directing the employee to highly productive labor with the fullest possible use of his or her potential;
- protective, determining the level of labor protection and compliance with labor legislation at the enterprise;
- organizational or reproductive, associated with a high level of training and retraining of employees;
- status-career, which ensures the implementation of career trajectories that best correspond to the personal aspirations and abilities of the employee;
- socio-psychological, ensuring a high level of maturity of organizational culture and a favorable socio-psychological climate;
- managerial, which implies the implementation of an active rational personnel policy, availability of personnel planning and forecasting mechanisms, as well as preventive programs and strategic development plans.

Let us correlate the parameters of decent labor [6] with the DQWL criterion indicators (*Table 1*).

The comparative analysis shows that it is possible to implement the principles and mechanisms of decent work management at enterprises, guided by the methodology of formation of decent quality of labor life, namely, through the use of an extended list of indicators, as well as diagnostic tools that allow to assess both individual functions of DQWL, and its integral indicator.

HYPOTHESES AND METHODS OF RESEARCH

The theoretical foundations of the processes under study are presented from the positions of systemic, qualification, competence, personal-activity and situational approaches. The main principles and provisions of these approaches allowed us to outline the key directions of the development of the concept of decent work in the conditions of deficit labor markets [7], as well as the functioning of the domestic economy against the background of external sectional pressure.

For the construction sector, where the defining characteristics are occupational safety, health protection, compliance with building codes and regulations, the ILO "Decent Work Concept",[10] the ILO Decent Work Concept and the ILO Guide "Occupational Safety and Health in Construction"[11] are conceptual doctrines on the basis of which social and labor relations should be built. At the same time, due to the heterogeneity of the construction market and the presence of regional specifics, it is important to study the implementation of these principles at construction enterprises in the regions, iden-

[10] See above.

[11] "Occupational safety and health in construction". ILO. URL: https://www.ilo.org/moscow/information-resources/publications/WCMS_312432/lang — ru/index.htm (accessed on 27.08.2023).

Table 1

Comparative analysis of decent work dimensions with indicators of a decent quality of working life

Functions of a decent quality of working life	Criteria indicators of a decent quality of working life	Indicators for assessing the effectiveness of decent work governance areas	Directions for implementing decent work management
Stimulating	Salary level; bonus system; level of labor motivation	Dynamics of labor remuneration; wage competitiveness coefficient	Labor remuneration management
Protective	Level of personnel loyalty; working conditions; compliance with labor guarantees	Number of violations related to non-compliance with labor protection legislation	Management of working conditions
Organizational	Labor organization system; labor content; labor rationing system	Number of activities related to organizational development; share of training costs in the personnel budget	Management of organizational and individual development
Status-career	Personnel evaluation and attestation system; retraining (professional development) system; career development system		
Social-psychological	Psychological climate; organizational culture; social guarantees	–	–
Managerial	Personnel policy; personnel situation; personnel planning and forecasting system	Personnel labor satisfaction coefficient	Labor satisfaction management

Source: compiled by the author.

tify common trends and develop recommendations to improve human resources policy taking into account these specifics.

In the course of work, the author of the study used general scientific and socio-economic methods, including counter modeling [8], analysis of documents and statistical data on labor markets, statistical analysis of data on personnel of organizations of the construction sector.

RESEARCH RESULTS

Decent work governance can be seen as a conceptual framework for human resources management at the national, regional, sectoral or organizational levels. The introduction of relevant provisions and ideas into human resources policies stimulates economic growth and the development of socio-economic systems at all levels. At the same time, it is important to understand that the integration of decent work management models is possible only in systems of a certain level of maturity that meet the necessary requirements and have certain resources.

Next, we will present an analysis of external and internal factors affecting the implementation of the concept of decent work in the enterprises of the construction industry in Novosibirsk.

Analysis of external factors affecting the implementation of the concept of decent work at enterprises of the construction industry

The first block of factors is determined by the general trends in the labor market of the Russian Federation, which largely affects the degree of maturity of national socio-economic systems. In general, the results of modern re-

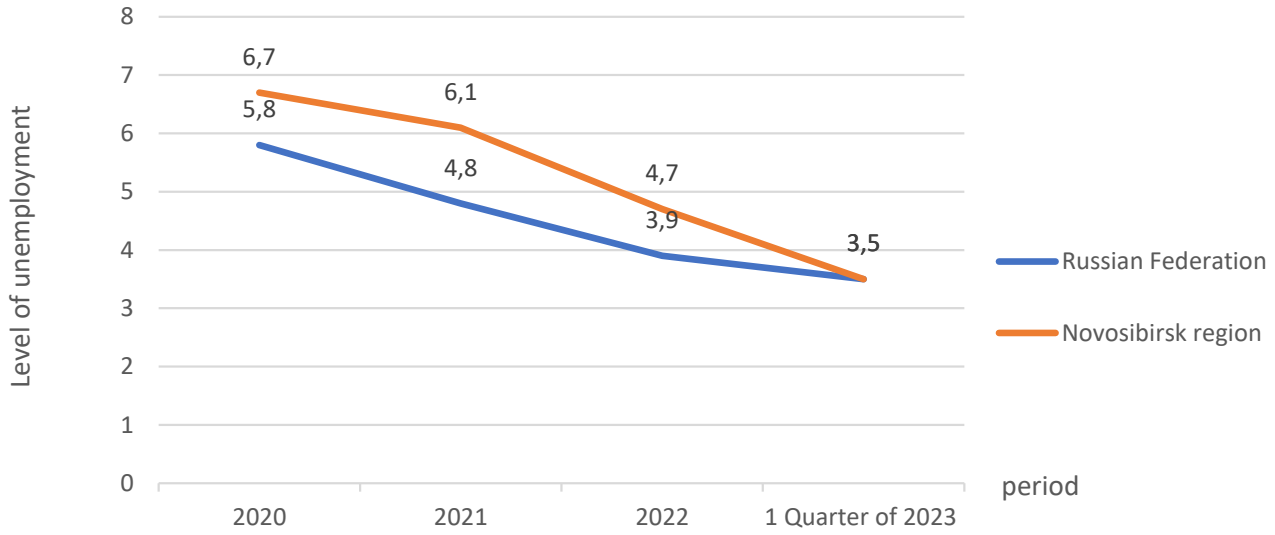

Fig. 1. **Dynamics of the unemployment rate in 2020–2023, %**

Source: compiled by the author based on data from the Federal State Statistics Service. URL: https://rosstat.gov.ru/labour_force

search indicate the presence of unfavorable trends in both domestic and sectoral and regional labor markets. Thus, there is a decrease in official employment and an increase in the share of shadow employment; there is an imbalance between the demand for labor and supply; underutilization of labor resources in many sectors of the economy is emphasized. Researchers also note the traditional for Russia problem of low labor costs [9]. This situation is developing against the background of a series of economic crises, which caused a decline in real incomes of the population, as well as a decrease in demand for labor [10].

Let us present some data characterizing the trends of the labor market in our country.

Calculation of the unemployment rate according to the ILO methodology shows stabilization of the situation on the labor market (*Fig. 1*), which indicates the effectiveness of the applied measures and the reduction of official unemployment.

In the total structure of the unemployed by types of economic activity, 5.5% falls on the construction sector. This is consistent with the total number of employees in this sphere — 6.7% in the total structure of the employed population at the end of 2022.

In the Novosibirsk Region, the following indicators are noted (*Fig. 2*).

Taken together, the above data show that there are no major changes in labor and employment in the period 2019–2021. The number of employees in the construction industry for the above period ranges from 6.7 to 7.1% of total employment, i.e. there is a slight increase. The results relating to the Novosibirsk Region (NSR) can be extrapolated to Russia as a whole — according to official data, this sector employs 6.7% of those employed in the national economy.[12] At the same time, the share of qualified construction workers in the structure of the population employed in their main jobs is only 3.4%.

At the same time, against the background of a slight positive dynamics of labor market indicators, the forecast values of employment indicators in construction have a nega-

[12] Labor resources, employment and unemployment. Rosstat (official website). URL: https://rosstat.gov.ru/labour_force (accessed on 27.08.2023).

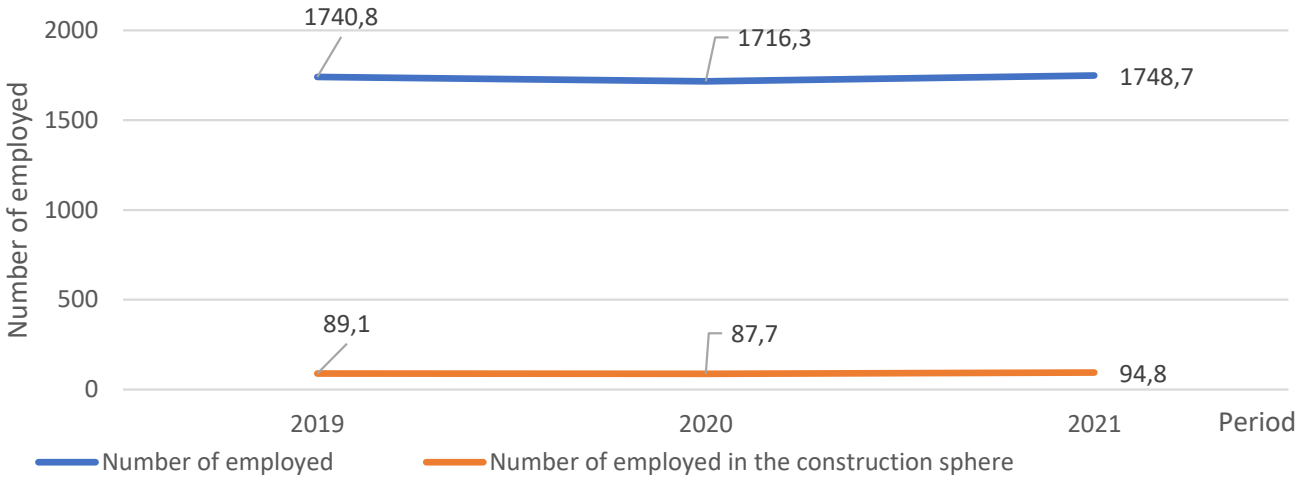

Fig. 2. **Dynamics of the number of people employed in the Novosibirsk region, incl. from the construction industry, thousand people**

Source: compiled by the author based on data from the Federal State Statistics Service. URL: https://rosstat.gov.ru/labour_force

tive character. Thus, according to the Institute of Statistical Research and Knowledge Economy,[13] there is a decrease in the growth rate of estimates of the projected number of employed in the industry — this estimated indicator decreased by 6 points. At the same time, the index of aggregate employment in the industry sector remains highly active, which indicates a much smaller effect of the sanctions pressure on the domestic labor market compared to the negative period of the pandemic.

Another recent trend noted by domestic and Western researchers concerns non-standard forms of employment [11–14]. The data of sociological studies show that in the world the share of the non-standardly employed is up to 40% of the total working population; in Russia the number of employees who can be classified as non-standardly employed reaches 14.4–14.6 million people. [11]. The key factors behind the shift in the employment paradigm are related to technical and technological reasons.

With high flexibility and the ability to meet the needs of both workers and employers, non-standard employment generates serious risks of precarization, associated with reduced protection of certain categories of workers, violation of their labor rights and guarantees [15]. E.V. Maslennikova, E.A. Kolesnik and O.A. Antonova pay special attention to the need to consider this form of employment in terms of the principles of the concept of decent work, which will reduce precarization risks, ensure social protection of workers and allow for social dialogue [13]. At the same time, the results obtained by various authors when studying the types of non-standard employment through the prism of the concept of decent work show the opposite situation — it is in this sector that a significant number of predictors of unstable, insecure social and labor relations are identified [11]. H.J. Kim, R.D. Duffy, B.A. Allan in their study found that only 35% of survey participants reported above average results in all components of decent work. In general, five profiles were identified — average level

[13] Composite indicators of employment in the basic sectors of the Russian economy: expected focus of changes in the labor market in the third quarter of 2022. URL: https://www.hse.ru/data/2022/08/03/1661234120/Composite_indice_2Q2022.pdf (accessed on 17.08.2023).

of components of decent work; low level of health care; unstable work; only health care and decent work [16].

The already mentioned authors of the publication [13], studying forms of non-standard employment, write about the risks in relation to fair wages, social dialog, safe working conditions, prospects for personal growth, as well as equal opportunities. Thus, this area of employment should attract increased attention from the state and supervisory authorities as an area of increased risks of non-compliance with decent work standards [13].

It is important to note that for the sectoral labor market serving the construction industry, there are common forms of non-standard employment with high risks of precarization. These include temporary (seasonal work, ad hoc work) and part-time (part-time work) employment; multilateral (employment through private employment agencies) and disguised (replacement of labor relations with civil law contracts) employment relations.

General conclusions regarding the current situation indicate the imperfection of the existing employment policy in the labor market — employees are offered such conditions and salary levels that official employment for job seekers becomes unattractive [9]. This indicates the insufficient attention of employers to the key areas of decent work — organization of workplaces, working conditions and remuneration, and requires systemic solutions related to the management of human resources potential and the introduction of additional mechanisms for regulating the labor market.

The second block of external factors affecting the possibility of implementing the principles of decent work at the enterprises of the industry is directly related to the peculiarities of the development of construction as one of the most priority areas of the economy. Attention to the implementation of projects in this area at the municipal and national levels is associated with the national project "Housing and Urban Environment",[14] extended until 2030. According to experts' estimates, in 2023–2027, government spending on construction will exceed 20 trillion roubles, which is equivalent to 14% of federal budget expenditures.

The construction industry of the Russian Federation is characterized by multidirectional trends.

In the current market conditions, super-large and large companies are reorganizing (for various reasons). Medium-sized companies are supporting the tasks set out in national projects, primarily due to the availability of government funding. Given the size of the Russian territory and the growing need for investment in infrastructure and construction in general, the domestic market can be described as weak and non-competitive relative to other countries of comparable size.[15] There are only six construction companies in our country with annual revenues of 100 billion roubles or more (their total revenue is just over 1.1 trillion roubles); in the period up to 2020, their number was slightly higher, but did not exceed eight or nine. Moreover, only four of these organizations operate as independent single players [NIPIGAS, Mosinzhproekt, RZDstroy, Gazstroyprom (from Gazprom's group of construction companies)].

Small and medium-sized enterprises of the construction sector are actively involved directly in the construction process, as well as in carrying out finishing, plumbing, electrical works, landscaping [17]. Thus, the industry is heterogeneous, i.e. organizations of different

[14] Passport of the national project "Housing and Urban Environment". URL: https://minstroyrf.gov.ru/upload/iblock/329/NP_ZHil_e_i_gorodskaya_sreda_01.10.2018.pdf (accessed on 02.09.2023).

[15] Construction. The largest companies and major trends in the industry. 2021. URL: https://nainfracom.ru/wp-content/uploads/2022/03/%D 0%98%D 1%81%D 1%81%D 0%BB%D 0%B 5%D 0%B 4%D 0%BE%D 0%B 2%D 0%B 0%D 0%BD%D 0%B 8%D 0%B 5-InfraOne.pdf (accessed on 02.08.2023).

Table 2

Overview of the educational market in the areas of training in the field of construction

Name of educational organization	Number of budget places and places with full cost reimbursement	Number of graduates in the 2021–2022 academic year, people	Examples of areas of training
Novosibirsk Construction and Installation College	200	217	Installation and operation of internal plumbing, air conditioning and ventilation. Construction and operation of buildings and structures
Novosibirsk Vocational Training Center No. 1	192	87	Carpenter, plasterer
Novosibirsk Architectural and Construction College	225	176	Construction and operation of buildings and structures. Master of finishing construction and decorative works
Siberian State University of Railway Engineering	72	82	Industrial and civil construction. Water supply and water disposal
Novosibirsk State University of Architecture and Civil Engineering	738	442	Water supply and drainage. Urban construction. Design of buildings and structures, etc.

Source: ccompiled by the author on the basis of data from reports on the results of self-examination presented on the official websites of educational organizations.

sizes and organizational and legal forms are involved in the work.

Regardless of the size and peculiarities of business, heads of construction companies note a high deficit of professional staff. At the All-Russian Construction Congress "Creation: How to Build Russia" the heads of the industry enterprises did not ask the country's government to take measures to support business. More emphasis was placed on the importance of state assistance in training qualified engineering and technical personnel for construction sites. There is a need for projects to raise the prestige of construction specialties and the creation of a full-fledged school for engineers and technicians.[16]

Secondary and higher specialized educational institutions are the main source of replenishing the labor market with professional staff. An analysis of the educational infrastructure that trains workers and engineers for Novosibirsk shows that the city has a choice of various training programs in construction areas (*Table 2*).

In general, there is an increase in the number of budgetary places in educational institutions, as well as places with full reimbursement of costs. This indicates the adaptability of the education system to the needs of the construction industry.

At the same time, in 2022 the total number of graduates of organizations of higher and secondary education in construction training areas (including economic and management) was about 1000 people. At the

[16] Key players in the construction industry discussed its development strategy in the new economic environment. RBK. 04.10.2022. URL: https://presscentr.rbc.ru/tpost/fmc4roec61-klyuchevie-igroki-stroitelnoi-otrasli-ob (accessed on 02.08.2023).

same time, the HH.ru service data show the following trends in Novosibirsk and the Novosibirsk Region:

- the number of vacancies in the field of construction increased by 53% in relation to 2021;
- the number of resumes received by construction companies relative to 2021 increased by 17%;
- construction and real estate are among the fields with the highest demand for professionals;
- hh. index in the construction industry as of January 2023 was 0.9. This means that at that time there was less than one person applying for one vacancy, which indicates a deficit labor market in Novosibirsk in this area.[17]

The comparison of the demand for vacancies in the field of construction and the number of graduates in these areas of training shows that the educational sphere does not adequately provide the market with young specialists and does not solve the problem of lack of professional staff.

The construction industry is also characterized by the active use of unskilled migrant labor [18, 19]. Russia is among the leading countries in terms of the number of the latter, and about 40% of them are employed in the construction industry.[18] At the same time, it is important to understand that foreign labor resources are attracted precisely in order to save the wage fund, to avoid the costs of creating favorable and safe working conditions, social programs, etc. Labor migrants accept jobs that are defined in the world as "3D jobs" (heavy, dirty, non-prestigious) [20]. Field inspections of the Federal migration service (FMS) additionally confirm the above-mentioned — a significant part of the facts of illegal employment of foreign labor refers to the construction industry. Consequently, there are preconditions that it is in this industry that companies are not fully guided by the concept of decent labor.

Thus, the external factors that can influence the peculiarities of the implementation of this concept at small and medium-sized enterprises in the construction sector are:

- heterogeneous market of players — from large developers to small businesses acting as subcontractors in the performance of individual project tasks;
- availability of state support for the construction industry;
- increased attention to the industry on the part of the authorities, control at different stages of construction project implementation;
- deficit labor market, imbalance between supply and demand for labor, lack of qualified specialists;
- high share of migrants performing unskilled work in the construction sector.

Analysis of external factors affecting the implementation of the concept of decent work at enterprises of the construction industry

To assess some internal factors of decent work management, let us consider the activities of medium and small construction companies, defining them as examples of nested samples illustrating the presence of fairly typical intra-organizational conditions such as staffing levels, qualification structure, work organization and safety, etc., and explaining expert assessments of general trends in decent work conditions in the construction industry.

The analysis of internal factors, which, according to experts, are general trends in the construction industry, should begin with the analysis of labor remuneration policy.

[17] HeadHunter Company (official website). URL: https://hh.ru (accessed on 28.08.2023).

[18] Statistical information on the migration situation. Ministry of Internal Affairs of the Russian Federation (official website). URL: https://xn — b1aew.xn — p1ai/dejatelnost/statistics/migracionnaya (accessed on 28.08.2023).

Table 3

The main characteristics of the analyzed enterprises of the construction industry for 2022

Company name	Average headcount, people	Staff turnover rate	Average salary level, roubles
LLC "Sibresource"	42	7%	26 100
LLC "RSU-GIRS"	101	24%	32 700
LLC "StroyTrest"	26	54%	37 400

Source: compiled by the author based on the report of Sibresurs LLC. URL: https://www.sibres.ru/; RSU-GIRS LLC. URL: https://sbis.ru/contragents/5405499901/540901001; StroyTrest LLC. URL: https://focus.kontur.ru/entity?query=1155476056119

The study of the methods of labor remuneration most common in construction companies revealed that 92.3% of skilled workers are paid for time worked; 5.9% are paid per unit produced; and 3.3% receive a fixed amount. When using the last two methods of labor remuneration, earnings are significantly higher than the average (compared to all sectors of the economy).

As examples, we present information on three enterprises in Novosibirsk:

- LLC "Sibresource", providing services for modernization and conversion to aluminum oxychloride (OXA) of water treatment facilities, solves complex technological problems through the introduction of modern methods, technologies and reagents;
- LLC "RSU-GIRS", carrying out the following types of activity — production of other finishing and completion works, production of building metal structures, products and their parts; construction of residential and non-residential buildings;
- LLC "StroyTrest", specializing in construction of residential and non-residential buildings.

Some characteristics of organizations are presented in *Table 3*.

According to *Table 2*, all three organizations belong to the category of small enterprises. Two of them have problems related to staff turnover. It is also necessary to note the low level of labor remuneration. The average value of the offered salaries in the construction sector, according to the data of the company HH.ru, is 58,969 thousand roubles.[19] Thus, one of the reasons for turnover may lie in the non-competitive remuneration of employees.

In the concept of decent work management, the creation of safe workplaces and appropriate working conditions is of great importance.

The analysis of Rostrud data shows negative dynamics in the statistics of occupational injuries in construction. According to the reporting data of 32 regional trade union organizations, 127 accidents occurred in the industry, 85 of them — severe and 38 — fatal (which is 12% of all industrial fatalities in 2021) [21]. According to information from state sources, 258 workers died in 2021; 718 accidents with severe consequences occurred: 47 of them were group accidents, 220 were fatal, and 451 were serious accidents.[20] Thus, the construction industry remains one of the most injury-prone, with one of the main reasons being poor organization of work (every third accident occurs because of this). The second place is occupied by non-compliance with labor discipline, the third place is occupied by violation of traffic rules, and the fourth place is occupied by violations of tech-

[19] HeadHunter Company (official website). URL: https://hh.ru (accessed on 28.08.2023).

[20] Labor protection in construction — 2022. Technoprogress. 04.03.2022. URL: https://tehnoprogress.ru/ohrana-truda-v-stroitelstve-2022/ (accessed on 20.08.2023).

nological processes.[21]

The share of persons whose working conditions are recognized as harmful is 36.9% of the total number of those employed in the industry. Compared to the data of 2021, there is a decrease in the value of this indicator by 2.5%. In this regard, it is the responsibility of the company's management to organize work at such workplaces in a special way.[22]

The analysis of the enterprises under review showed that all three of them implement a special assessment of working conditions (SAWC), based on the results of which appropriate management decisions are made. Thus, "StroyTrest" established a shorter working week for its employees, determined additional days of paid vacation, allocated an allowance in the amount of 4% of the salary part and additionally added insurance premiums for harmful working conditions. The company applies in practice the results of the special assessment and makes additional payments to employees with harmful working conditions by introducing a mandatory clause in labor contracts and concluding additional agreements with employees hired prior to the special assessment of working conditions.

The most important technology of personnel policy, presented in the model of decent work management as a separate direction, is organizational and personnel development [6]. In this context, it is necessary to note the addition of Article 55.5–1 to the Urban Development Code of the Russian Federation, which came into force on September 1, 2022[23]; according to these amendments, construction organization specialists no longer need to upgrade their qualifications. Clause 4 of this article states the obligation of construction management specialists, whose information is included in the National Register, to undergo independent qualification assessment at least once every five years in special centers [qualification assessment centers (QACs)], of which there are already more than 60 in the Russian Federation. Due to the short period of validity of the above changes, there are no practical examples of employees of construction companies undergoing independent qualification assessment. At the same time, in Novosibirsk, such assessment in the construction sector is carried out by:

- Novosibirsk Regional Interindustry Qualifications Assessment Center (LLC "NRIQAC"), established in 2017, which is a joint project of the Novosibirsk City Chamber of Commerce and Industry and the Interregional Association of Business Executives. NRIQAC carries out assessment in the fields of energy, construction, engineering, housing and utilities, and finance.
- Association in the field of construction "Siberia Builders Qualification Assessment Center", conducting an independent assessment of specialists of the construction complex on the qualification "Chief Project Engineer (specialist in construction organization)".
- Intersectoral Center "TechnoProgress", assessing qualifications in the field of engineering surveys, urban planning, architectural and construction design.
- LLC "Siberia Qualification Assessment Center", implementing independent assessment of professional qualifications in the specialties "chief architect of the project (specialist in the organization of architectural and construction design)" (qualification level 7) and "chief engineer of the project (specialist in the organization of architectural and construction design)" (qualification level 7).

The study of external and internal factors de-

[21] Ibidem.

[22] Ibidem.

[23] Town-planning Code of the Russian Federation of 29.12.2004 No. 190-FL (version of 19.12.2022) (as amended and supplemented, in force since 01.02.2024). URL: https://www.consultant.ru/document/cons_doc_LAW_51040/ (accessed on 20.08.2023).

termining the features of the implementation of the concept of decent work in the construction sector is important to complement the analysis of indicators recommended by ILO.[24]

Indicator 1. Number of legislative and other regulatory legal acts in the field of labor and other directly related relations approved by all parties to social partnership in the construction industry.

In the construction sector, the Industry Agreement for 2020–2023 is in force,[25] which contains provisions on the implementation of social partnership principles in the sphere of ensuring labor rights of employees and compliance with the requirements of safe working conditions at enterprises in the construction industry of the Russian Federation. According to this document, employers undertake to provide their employees with decent and fair wages, real wage growth in accordance with the contribution of employees to the final results of the organization; healthy and safe working conditions; employment of employees; professional development and professional growth; corporate social guarantees. The Industry Agreement also stipulates the tasks of the Russian Builders' Trade Union to protect its members, participate in the conduct of special assessment of working conditions, training of trade union labor inspectors, etc.

Thus, within the framework of social partnership in the construction industry the key areas of decent labor conditions management are regulated.

It should also be noted that the sectoral trade union participates in the improvement of the regulatory and legal framework as part of the working group of the Russian Tripartite Commission for the protection of labor rights, labor protection, industrial and environmental safety.

Indicators 2, 3. Number of labor violations; Number of penalties imposed on employers; Number of collective labor disputes.

In 2022, 9,000 inspections were conducted in the construction sector in Russia and 29,000 labor law violations were identified, including:

- violations of collective labor agreements — 100 cases;
- violations of labor contract provisions — 2,200 cases;
- violations of working hours and rest time — 1,000 cases;
- violations of provisions on labor payment and rationing — 4900 cases;
- violations of guarantees and compensations — 600 cases;
- violations of medical examinations — 2800 cases;
- violations of training and instructing on labor protection — 4000 cases;
- violation of providing employees with PPE (personal protective equipment) in 2600 cases;
- other violations.[26]

It is important to note that absolutely for all indicators there is a dynamics of reduction in the number of violations compared to last year.

Indicator 4. Number of organizations where collective labor disputes and strikes took place. Number of employees involved in collective labor disputes and strikes. Amount of time not worked by employees who participated in strikes.

According to the Center for Monitoring and Analysis of Social and Labor Conflicts, 99 social and labor conflicts (SLC) occurred in 2022; 270 events indicating public protests of workers and other forms of collective action to protect labor rights were registered. The Siberian Federal District accounts for 13% of the total number of social and labor conflicts (SLCs). The analysis

[24] Decent work indicators. Methodological explanations for calculation. Rosstat (official website). URL: https://rosstat.gov.ru/labor_market_employment_salaries (accessed on 07.07.2023).

[25] Industry agreement for 2020–2023. Trade Union of Builders of Russia (official website). URL: http://www.strop-rf.ru/docs/sogl/(accessed on 07.07.2023).

[26] Labor and employment in Russia. 2021. Statistical Collection. Moscow: Rosstat; 2021. 177 p.

shows an increase in the share of labor conflicts of interest, which arise for such reasons as reduction in the level of wages of employees, cancellation of part of bonus payments and other additional payments (compensations) due to difficulties in economic and production activities under sanctions, as well as reduction of employees at problem enterprises, non-compliance with working conditions (regimes), etc., which are not violations of labor legislation and the "Law on Trade Unions". Construction industry enterprises accounted for 9% of the total number of social and labor conflicts (SLCs) in the Russian Federation.[27]

The researchers note that the situation in the social and labor sphere, which changed after the start of the special military operation and the imposition of sanctions by Western countries against the Russian economy, did not significantly affect the sectoral redistribution of social and labor conflicts (SLCs).

Indicator 5. Number of organizations where decisions are made with the participation of trade union organization representatives in the course of work of collegial management bodies [general meeting, board of directors (supervisory board), management board].

The general trend observed in both foreign and Russian companies indicates the decline in trade union membership, the aging of the trade union movement and the presence of the problem of formal participation of trade unions in the social and personnel policy of organizations [12]. In small and medium-sized businesses, which include many enterprises of the construction sector, trade unions are practically absent.

The Novosibirsk Regional Organization of Trade Union of Workers of Construction and Building Materials Industry of the Russian Federation was registered in 1996. Its structure includes such companies as JSC "Iskitimcement" — one of the leading enterprises of cement industry in Siberia, operating since 1934, CJSC "Chernorechenskiy Quarry" — since 1933, RSU No. 5 "Novosibirskgrazhdanstroy", JSC "NovosibARZ" — since 1968, etc.

Thus, the state of the labor market and general trends in the construction industry allow us to characterize the current situation as unstable, requiring additional efforts to improve the quality of working life both from the state and from the enterprises themselves.

Such analysis, implemented in the context of the industry and the region, contributes to the annual monitoring of decent work of employees and the detection of negative trends, as well as the search for opportunities to eliminate the problems. In domestic studies, the solution of the problem of decent work deficit is considered as one of the key areas of improvement of the modern labor market. At the same time, it is important to note the need to involve all subjects of social and labor relations — authorities, employers and workers themselves — in solving these problems [12].

CONCLUSIONS

As a result of the study of the general concept of decent work and the peculiarities of its implementation at small and medium-sized enterprises in the construction sector in the regional market of Novosibirsk Region (NSR) certain conclusions are made.

Sustainable development of modern socio-economic systems is based on the optimal use and development of human capital, which is provided by DQWL at the macro- and micro-level. Its achievement is conditioned by the systemic management of decent labor conditions in domestic companies.

In the Russian economy, the construction industry performs vital strategic functions. This

[27] Preliminary results of the development of social and labor conflicts and analysis of the social and labor situation in the Russian Federation in 2022 (January-September) 14.10.2022. URL: http://industrialconflicts.ru/lib/104/predwaritelynye_itogi_razwitiya_sotsialyno-trudowyh_ko.html (accessed on 18.07.2023).

sphere employs more than 6% of the working population of the Russian Federation.

The sectoral labor market of the construction industry is characterized by the following trends:

- heterogeneous composition of players — from large developers to small business enterprises acting as subcontractors in the performance of individual project tasks;
- availability of state support for the construction industry and increased attention from the authorities, control at different stages of construction project implementation;
- a significant share of unskilled labor in the industry with a shortage of professional construction personnel;
- a high number of migrant workers employed in construction and potentially ready for precarization employment;
- the educational sphere does not adequately provide the market with young specialists and does not solve the problems of insufficient professional personnel;
- presence of preconditions for non-standard employment that increase the risks of precarization of workers — seasonal work, ad hoc work, part-time work, multilateral employment relations (employment through private employment agencies); disguised employment relations (replacement of employment relations with civil law contracts), etc.;
- low competitive level of labor remuneration for working professions;
- high staff turnover at the enterprises of the industry;
- high risks of occupational injuries, the main cause of which is unsatisfactory work organization;
- high share of workplaces with harmful labor conditions.

All these factors determine the specifics of personnel work at enterprises of the construction industry and require close attention of employers to the implementation of the concept of decent labor.

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