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The Concept, Features and Prospects for the Metaverse Construct Development

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ABSTRACT

The paper discusses formation features of the metaverse concept in terms of the active introduction of information and communication technologies (ICT) into the state governance and business. The work' goal is to study the concept content, its structure and development prospects. The author used such general scientific research methods as content analysis, comparative and correlation analysis, grouping, synthesis, systematization. In order to reveal the concept content, the paper reflects various approaches to the definition of the term "metaverse". The author proposes his understanding and analyzes the issues of transition to the Web3 era and its relationship with the metaverse in the digital transformation of society and economy. The research presents a vision of the major elements of the metaverse at the current time. Despite the emerging risks, it assumes the active use of ICT and trends towards decentralization of the economy will contribute to the further implementation of the metaverse concept in our daily life. A practical significance of the research lies in the possibility of using its provisions in the compilation of strategies for the development of corporations and state institutions. As an inference, the study gives some recommendations to corporations on taking part in the creation and it makes development of virtual worlds and a conclusion about the prospects for the concept progress in the medium term.

Keywords: blockchain; virtual and augmented reality; metaverse; smart contracts; cryptocurrencies; non-fungible tokens (NFT); digital economy; web3

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INTRODUCTION

Recent decades have been characterised by widespread adoption of information and communication technologies (hereinafter, ICT) in state and corporate practices and changes in socio-economic processes, many of which are based on new governance principles. This situation is a consequence of the development of the digital economy, where previous models are either ineffective or inhibit actively developing market segments.

The dynamic development of ICT requires corporations to adapt their organisational structures to the new environment and their management systems to new tools and practices. This approach is particularly driven by their ability to effectively address specific challenges while influencing not only corporate business strategy, but also transforming sources of value creation in a short time frame.

In this context, the concept of the metaverse attracts particular attention. M. O. Kanyina and M. Poyan conclude that its formation has an impact on business models of corporations, contributing to new sources of value, establishing "new partnerships and valuable relationships in which the actual competitor may become a future provider of creativity, skills and experience", and expanding the virtual commerce market [1, p. 26]. In 2021, the concept was widely disseminated in public discourse, generating a lively debate about its content and development prospects.

For the purpose of this study, the increased public interest in the issue was analysed by comparing online search query statistics. For this task Google Trends and Yandex Wordstat tools were used to show changes in the content of search queries in different languages in relation to the total volume of search queries. *Fig. 1 and 2* show the number of online search queries for the term "metaverse" in Russian and English from 16 July 2021 to 16 July 2022.

The graphs show an increased search interest in the subject in both the Russian Federation and abroad, which in practice was driven by the announcement of Facebook's renaming to Meta Platforms [1] on 28 October 2021. Meanwhile, according to Google Trends, the next active surge in search queries came in January 2022 and in the Russian-language search engine in February 2022.

To investigate the content of the metaverse concept, it was necessary to:

1. To analyse the approaches to the disclosure of the content of the metaverse concept and its structure, and to formulate the author's definition of the term.

2. To consider the relationship between the concepts of metaverse and Web3 at the current stage of economic development.

3. To formulate recommendations for corporations on their participation in the creation and development of virtual worlds, as well as to outline the prospects of metaverse development.

The author assumes that even taking into account emerging risks, active implementation of information and communication technologies and the trend of economic decentralization will facilitate further integration of the metaverse concept

[1] On March 28, 2022 the Tverskoy District Court of Moscow published a reasoned judgment dated March 21, 2022 prohibiting the activities of the US multinational holding company MetaPlatforms Inc. in selling social networking products of Facebook and Instagram in the Russian Federation on the grounds of carrying out extremist activities. The appellate decision of the Judicial Division for Civil Cases of the Moscow City Court of 20 June 2022 upheld the decision of the court of first instance and the appeal was dismissed. These decisions do not apply to the activities of the company's messengerWhatsApp due to its lack of a public dissemination function. Hereinafter, the use of information about MetaPlatforms Inc. and its resources implies that it violates the requirements of Russian legislation on countering extremist activity. As of June 29, 2022, the ban is still in effect. URL: https://mos-gorsud.ru/rs/tverskoj/services/cases/civil/details/de7ea6a0-a3ab-11ec-8a7e-51b31fb55b35 (accessed on: 29.06.2022).

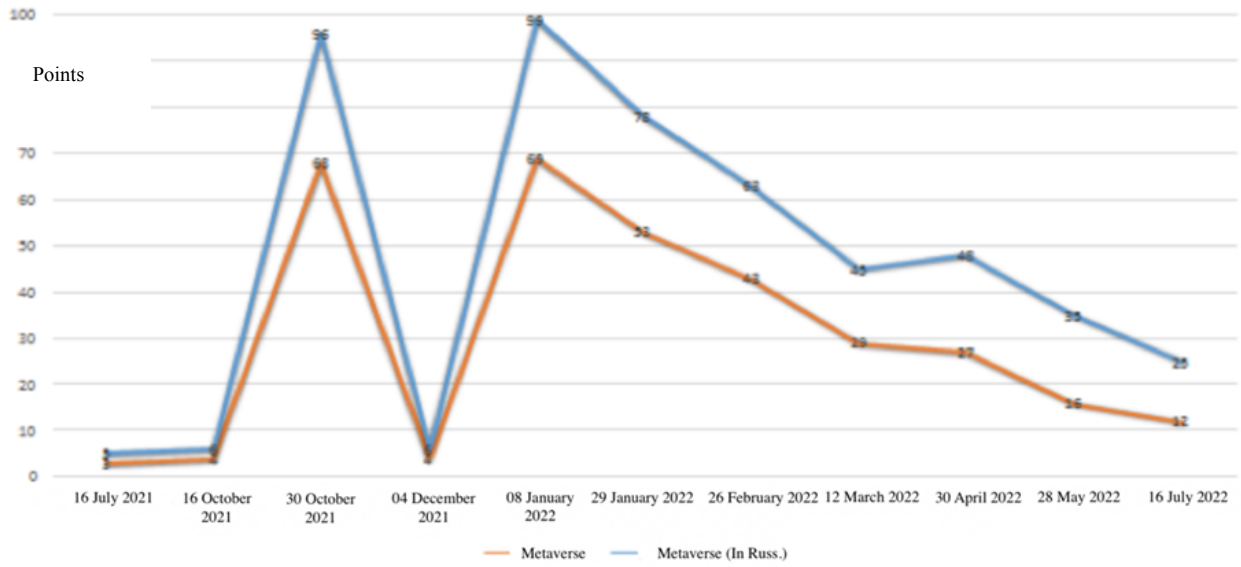

Fig. 1. **Popularity of online search queries for the term "metaverse" (In Russ.) / "metaverse" between 16th July 2021 and 16th July 2022 was performed with Google Trends in points, maximum value = 100**

Source: compiled by the author based on Google Trends.

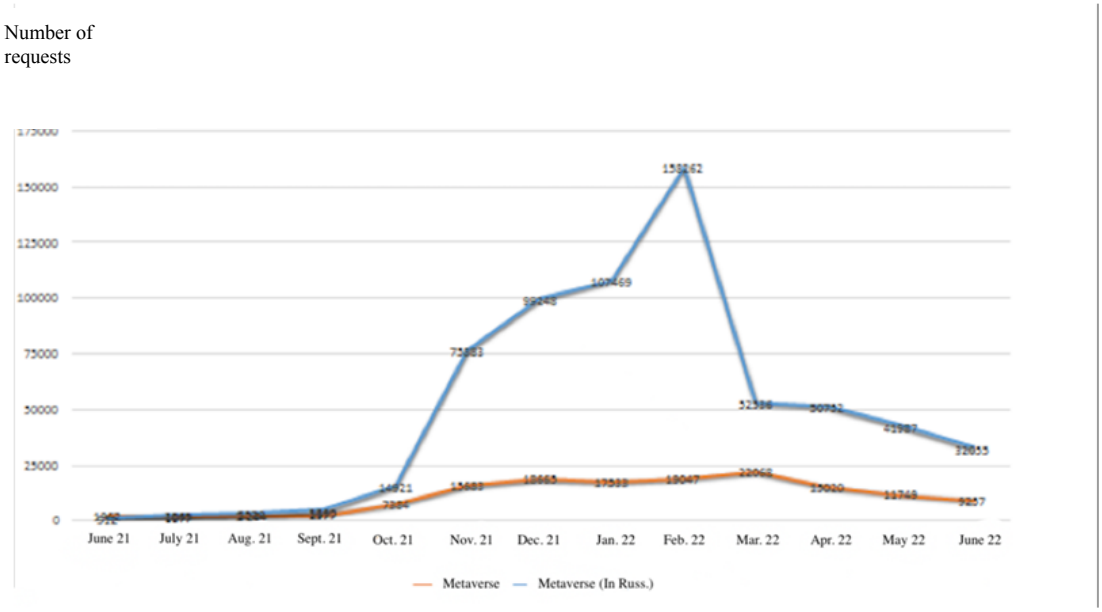

Fig. 2. **Popularity of online search queries for the term "metaverse" (In Russ.) / "metaverse" between 16th July 2021 and 16th July 2022 was performed with Yandex Wordstat by number of queries and requests**

Source: compiled by the author based on Yandex Wordstat.

in our everyday life. However, at the moment, all forecasts of its development cover only individual outlines and do not allow elaborating systematic and reliable models of its functioning.

THE METAVERSE: APPROACHES TO DEFINING CONTENT

The concept of a metaverse involves bringing together all virtual worlds alongside the physical world and ensuring

Table 1

Metaverse features

Characteristics	Description
Consistency	The metaverse never "pauses" or "ends", but simply continues indefinitely
Synchronised and lively interactions	The metaverse assumes a 'lived' (real-life) experience that exists all the time for everyone in real time
No limitations on simultaneous user capacity, and giving each user an individual sense of presence	In the metaverse, everyone can be part of it and share in a particular event (action), but at the same time, in isolation
A functioning economy	In the metaverse, people and businesses will be able to create, own, invest, sell and be rewarded for a wide range of work that produces value recognised by others
Combination of digital and physical worlds, and working on both open and closed platforms	The metaverse combines the possibilities of different worlds and technologies
Unprecedented compatibility	The metaverse ensures compatibility of data, digital items/assets, content, etc.
Контент и опыт	The metaverse contains experiences and content created and managed by a wide range of authors

Sourse: compiled by the author based on URL: https://www.matthewball.vc/all/themetaverse.

their interoperability. Currently, its main attributes are attributed by experts as immersive experience, real-time interactivity, user identification, interoperability across platforms and devices, simultaneous interaction of thousands of people, use directions covering human activities beyond games.[2]

In order to form an idea of the characteristics of the metaverse, one of the proponents of the concept, venture capitalist M. Ball, suggested that seven characteristics of the metaverse should be used in practice (*Table 1*).

Given the lack of a unified terminological framework in this context, the content of the term now needs to be clarified on a case-by-case basis. Approaches to the issue are very diverse and reflect different aspects of its activities (*Table 2*).

The author of this paper understands the metaverse as a sustainable network of permanent immersive virtual worlds connected to the physical world, in which an unlimited number of users interact with each other via digital avatars in real time on a wide range of issues recognised as valuable by other users.

TRANSITION TO THE WEB3 ERA: A NEW PARADIGM OF RELATIONSHIPS

The McKinsey survey on the practical creation of the metaverse and its potential, conducted in 2022, showed interesting results. Although the content of the term is still being understood, the authors of the survey conclude that the transit to the

[2] URL: McKinsey & Company. Value Creation in the metaverse. 2022. https://www.mckinsey.com/~/media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf P. 11. (accessed on: 05.07.2022).

Table 2

Approaches to the definition of the term "metaverse"

Definition	Sourse
A metaverse is an open, persistent, interactive, real-time virtual world that can be built using Web3 technologies	University of Cambridge. URL: https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/03/Policy-brief-Crypto-web3-and-the-metaverse.pdf
A metaverse is a large-scale and interoperable network of three-dimensional virtual worlds visualised in real time, which can be viewed synchronously and continuously by a virtually unlimited number of users with an individual sense of presence and continuity of data	MattewBall.vc. URL: https://www.matthewball.vc/all/forwardtothemetaverseprimer
A metaverseis a shared digital and online space populated by digital doubles (avatars) of people, places and things that interact in real time using 3D graphics	Roberto Moro Visconti [2, p. 1]
The metaverse is a future permanent and interconnected virtual environment in which social and economic elements reflect reality. Users can interact with it and each other simultaneously on devices and through immersive technologies when dealing with digital assets and property	World Economic Forum. URL: https://initiatives.weforum.org/defining-and-building-the-metaverse
The metaverse is a virtual environment that combines the physical and digital through the convergence of internet and web technologies and augmented reality	Lik-Hang Lee, Tristan Braud, Pengyuan Zhou, Lin Wang, Dianlei Xu, Zijun Lin, Abhishek Kumar, Carlos Bermejo, Pan Hui [3, p. 1]

Source: compiled by the author.

metaverse resembles the transition from Web1.0 to Web2.0, being, in fact, a new stage of the Internet development, which combines digital and physical life. Its pace, however, depends both on overcoming current technological limitations and on the quality of the user experience.[3]

Internet technologies have evolved rapidly over the past decades. Each stage in the development of the Internet has its own characteristics and simultaneously transforms the format of interaction between society and technology corporations, the ICT infrastructure, and the degree of control over the network (*Table 3*). The Web 1.0 internet (1990–2004) was based on open, decentralised protocols that were community-driven and presented information in a static form. In the Web 2.0 era (2005–2020), social networks are emerging, the number of users increases significantly with low or no distribution costs, and large IT corporations receive most of the revenue.

We are now at the beginning of the Web3 era, which combines the decentralised, community-driven world of Web 1.0 with the

[3] Ibidem, p. 5.

Table 3

Comparative characteristics of Web 1.0, Web 2.0 and Web3

		Web 1.0	Web 2.0	Web 3.0
	Organisational structure	Decentralised ownership. Participants interacted through basic protocols that were loosely regulated. Content was read-only and wholly owned by the creators, with no social interaction between participants	Centralised namespace management — Internet Corporation for Assigned Names and Numbers (ICANN). Members interact using highly standardised protocols managed by international organisations. Communities mainly create content and interact using technology platforms owned by major organisations and IT corporations	The community is usually managed through a decentralised autonomous organisation (hereinafter referred to as DAO) fund. Native tokens are issued. Decisions are made based on the consensus of the users. Community participants can include actors controlled by artificial intelligence
Platform characteristics/ network types	Data repository	None (data is stored decentrally in local formats)	Centralised (cloud storage managed by major IT corporations). Communities are mainly managed by elected leaders	Decentralised (local and cloud-based storage, managed by a large number of participants)
	Platform/ network format	PC Local networks	PC/Console. Virtual / augmented reality equipment. Mobile/desktop applications (Mobile/app)	PC/Console. Virtual / augmented reality equipment. Mobile/desktop applications are being developed (Mobile/app)
	Payment infrastructure	Electronic payments using real bank cards	Electronic payments using real and virtual bank cards. Specialised e-wallets. Local loyalty programme wallets	Cryptocurrency wallets
	Ownership of digital assets	The legal framework for digital assets is just emerging	Purchased for personal use or rented within the platform	Belongs to community members through NFT
	Digital asset portability	The legal framework for digital assets is just emerging	Locked inside the platform	Transmitted
Interaction with users	Content creators	Developers and website owners	Platform users and customers. Game studios and/or developers	Community. Game studios and/or developers. Artificial intelligence, including: virtual replicas of real people, fully virtual personalities, AI-controlled non-playable characters (NPCs) and robots
	Activities	Reading static text content. Commenting in guest books on websites	Socialisation. Multiplayer games. Streaming games. Competitive games (e.g. cyber sports)	"Play to Earn" Experience. The same actions as in Web 2.0

Table 3 (continued)

		Web 1.0	Web 2.0	Web 3.0
	Identification of the individual	Not available, user can name themselves arbitrarily for comments on each site (within Web 1.0 sites have guestbooks for comments, but the appearance of user accounts (profiles) on sites refers to Web 2.0)	Local authentication by email address or phone number, biometric authentication, platform avatar, cross-platform authentication capability	A self-contained and compatible identity. Anonymous identity based on a private key
	Payments	Electronic payments using bank cards	Electronic payments using bank cards, virtual wallets, loyalty points and discount coupons. Platform-based virtual currency	Cryptocurrencies and tokens
Revenues	Revenues from content	Mostly received by service providers	Shared between platform (app shop) and developers. Owners of platforms, search, sales, or super-applications receive revenue from content and advertising from B 2B clients (local sellers and advertisers). Financial corporations receive fees and commissions from all transactions and currency conversions	Developers (content creators) earn directly from sales. Users can earn through playing the game or participating in the management of the platform. Royalties to creators on the secondary market for NFT

Source: compiled by the author based on URL: https://www.mckinsey.com/~/media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf

advanced features of Web 2.0.[4] In practice, this process is supported by the transition from closed corporate Web 2.0 networks, which are owned and controlled by large IT corporations, to open Web3 crypto — networks, which are owned and controlled by the users.[5]

It should be noted that the terms 'metaverse' and 'Web3', periodically used interchangeably in practice, are not synonymous, although they are closely linked. Although Web3 encourages the development of a metaverse, in particular by supporting decentralisation, it is not inherently a metaverse, which can be either centralised or decentralised in terms of governance format.[6] The term "Web3" was introduced into the business world in 2014 by Ethereum co-founder G. Wood. He viewed it through the lens of a decentralised online ecosystem based on distributed technologies such as blockchain and DAO [4] rather than servers owned by individuals or corporations. Web3-based platforms and applications are not

[4] Navigating the Metaverse: A Guide to Limitless Possibilities in a Web 3.0 World. Wiley, 1st Edition. 2022.

[5] Grayscale. The Metaverse. Web 3.0. Virtual Cloud Economies. 2021. C. 7. URL: https://www.digitalcapitalmanagement.com.au/wp-content/uploads/2022/02/Grayscale_Metaverse_Report_Nov2021.pdf (accessed on: 08.08.2022).

[6] McKinsey & Company. Value Creation in the metaverse. 2022. URL: https://www.mckinsey.com/~/media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf (accessed on: 09.07.2022).

Table 4

Rules for the metaverse constructing

No.	Rules	The essence of the rules
1	There is only one metaverse*	Metaverse is the sum of all publicly accessible virtual worlds, real-time 3D content and related media, connected to an open global network, uncontrolled and accessible to all
2	Metaverse is for everyone	Metaverse is for everyone, with political and socio-economic implications
3	No one controls the metaverse	Metaverse is run in the common interest and for the greatest good of as many people as possible
4	Metaverse is open	Metaverse is built on compatible technologies and tools, connected by strictly defined and widely agreed upon free and open communication standards
5	Metaverse is hardware-independent	Metaverse is hardware-independent and available on any device, regardless of display type and form factor
6	Metaverse is a network	Metaverse is a computer network of publicly accessible virtual worlds, real-time 3D content and related media
7	Metaverse is the internet	Metaverse is an improved and modernised Internet for consistent delivery of 3D content, spatially organised information and experiences, and real-time synchronous communication

Source: URL: https://medium.com/meta-verses/the-seven-rules-of-the-metaverse-7d4e06fa864c

* *Note:* John Garon believes that in the future there will be not a single metaverse, but a multiverse, which is a free confederation of separate virtual worlds with its own set of management tools. URL: http://dx.doi.org/10.2139/ssrn.4002551

owned by a central authority, but by users who get their share in ownership and greater control over their own data by helping to develop and maintain these services.[7] According to Cambridge University experts, Web3 refers to the next generation of technical, legal and payment infrastructure, including blockchain, smart contracts [5] and cryptocurrencies.[8]

Most Web3 projects currently in existence could fall into one of three categories: decentralised blockchain-based finance, decentralised digital service delivery, virtual collectibles.[9] Accenture's 2022 "Digital Health Vision Concept" report states that Web3 will enable the movement of data along with the individual, who will be present in a metaverse with digital content rather than a platform.[10] In essence, the Web3 is an Internet owned by developers and users who interact with each other without intermediaries (as opposed to Web 2.0.) using digital tokens.

The transition to Web3, which is based on the Web 2.0 infrastructure, is expected to be costly and gradual. Such a massive undertaking implies a dramatic change in the economy and active cross-industry work on a wide range of issues.

[7] Wired. The Father of Web3 Wants You to Trust Less. 2021. URL: https://www.wired.com/story/web3-gavin-wood-interview/ (accessed on: 09.07.2022). P. 13.

[8] University of Cambridge. Policy Brief. Crepro, web3, and the Metaverse. 2022. P. 5. URL: https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/03/Policy-brief-Crypto-web3-and-the-metaverse.pdf (accessed on: 09.07.2022).

[9] URL: https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/03/Policy-brief-Crypto-web3-and-the-metaverse.pdf (accessed on: 09.07.2022).

[10] Accenture. Accenture Digital Health Technology Vision 2022. Meet Me in the Metaverse. How the continuum of technology and experience is reshaping healthcare. 2022. P. 4. URL: https://www.accenture.com/_acnmedia/PDF-178/Accenture-Digital-Health-Technology-Vision-2022.pdf#zoom=40 (accessed on: 09.07.2022).

KEY ELEMENTS OF THE METAVERSE

At the moment, technologies that would allow millions of people to participate in a "shared synchronous experience" simultaneously,[11] do not exist or are very fragmented in terms of their long-term use. Currently, technologies that would allow millions of people to participate in simultaneous synchronous experiences are either not available or very fragmented in terms of their use in the long term. The current debate on the concept is therefore primarily about forecasting its development so that it can compete with the real economy in the future.

Investor T. Parisi has formulated seven rules of the metaverse that reflect one approach to its construction and can be taken into account when developing a strategy in this area (*Table 4*).

Continuing this discussion, K. Nabben identifies two opposing approaches to the development of the metaverse. According to the first, large corporations will determine people's behaviour on their own, creating private virtual worlds in which value is extracted from users as consumers. The other approach assumes a decentralized technological architecture (e.g. based on blockchain technologies) in which DAOs [6] create their own worlds and distributed communities collectively own and manage assets in digital worlds (public virtual worlds) [7, p. 1]. In this context, D. Vidal-Thomas notes that if the IT giants create their private virtual worlds with a working virtual economy that can be based on fiat currencies and traditional trade, it will be very difficult to compete with them [8, p. 25]. In any case, given the fact that people are spending more and more time in virtual environments, it is crucial to understand who will create and control them. In this regard, Jules F. Verne rightly brings issues of trust to the forefront in such environment [10].

The literature identifies eight key elements that contribute to the creation and development of a metaverse (*Table 5*).

McKinsey, in its turn, includes four main building blocks in the structure of the metaverse, the process of its development largely depends on the improvement of their compatibility: content and expertise, platforms, infrastructure and hardware, means of implementation (*Table 6*). Note that this approach is only an assumed structure of the metaverse, which will not necessarily be presented in this form in practice, given the speed of ICT development and the rapid digital transformation of society and the state.

Thus, it is clear that visions of possible models for the creation and development of a metaverse are now emerging, for which an appropriate level of technological development, infrastructure and content will be required in the medium term, drawing on customer experience.

PROSPECTS FOR THE METAVERSE

While research and consulting firm Gartner (US) lists metaverse as one of the top five trends and technologies of 2022, there is an assumption that it is not likely to completely replace current digital interactions (e.g., through apps), but it is likely to facilitate new types of connections and business models, fundamentally changing the way both people and corporations communicate with each other and with the outside world,[12] and stimulating new products and services. In addition, the development of virtual societies and networks may extend beyond the boundaries of a single state to address inter-state interactions.

In this regard, it should be noted that the creation of a metaverse implies the emergence

[11] URL: https://www.matthewball.vc/all/forwardtothemetaverseprimer (accessed on: 11.07.2022).

[12] Impactful technologies from the Gartner Emerging Technologies and Trends Impact Radar for 2022. 2021. URL: https://www.gartner.com/en/articles/5-impactful-technologies-from-the-gartner-emerging-technologies-and-trends-impact-radar-for-2022 (accessed on: 11.08.2022).

Table 5

Key elements of the Metaverse

Key elements	Functions
Computational capacity	Providing computing capacity to support the metaverse (physical computing, data matching and synchronisation, artificial intelligence, etc.)
Networking	Providing real-time, high-bandwidth, continuous connectivity, and decentralised data services to consumers
Virtual platforms	Development and operation of immersive digital and three-dimensional simulations, environments and worlds in which users and corporations can explore, create, communicate, and participate in various activities and economic activities
Exchange tools and standards	Creation of tools, protocols, formats, services, and mechanisms that act as de facto (or de facto interoperability) standards and enable the creation, operation, and improvement of the metaverse
Payment transactions	Support for digital payment processes and transactions, including financial services and the exchange of fiat currency for digital currency
Content, assets, and identification services	Creating, selling, reselling, storing, securely protecting and financially managing digital assets, such as virtual commodities and currencies, linked to user data and identity
Hardware	Sale and support of physical technology and devices used to access, interact with, or develop the metaverse
User behaviour	Observation of changes in consumer and business behaviour (including spending and investment, time and attention, decision-making and opportunity) that are either directly related to, or otherwise contribute to, the metaverse or reflect its principles and philosophy

Source: URL: https://www.roundhillinvestments.com/assets/pdfs/METV_Deck.pdf; https://www.matthewball.vc/all/forwardtothemetaverseprimer

of relevant risks that should be taken into account when assessing this area of activity and building a risk management system in the corporation. These may include the issues of legal regulation, security, data privacy, identity, ethics, distribution of destructive content, copyright and biometric data protection, antimonopoly regulation, professional retraining of specialists and users, impact of ICT on human health, environmental pollution, creation of fake avatars, etc.[13] [11–13]. Given the scale of projected transformations, some authors do not exclude that gradually the concept of metaverse may turn into a "metacurse" [14].

F. Yu. Wang et al. emphasize that, at the moment, the "meta-economy" functions in parallel with the real economic system [15, p. 4]. D. Vidal-Thomas, for his part, points out that it is characterized by speculative cryptocurrency tokens and is run by traders who provide explosive growth through speculative trading, rather than meta-users who are genuinely interested in immersive experiences. For this reason, the metaverse in its current state is seen by the economist as "a speculative digital world that should be avoided by meta-users who are looking for a pleasurable immersive experience without speculative goals" [8]. This thesis can be traced back to the dramatic fluctuations in the value of virtual real estate [16]. According to digital real estate platform operator WeMeta, trade in virtual land on six platforms, including Decentraland and The Sandbox, was down

[13] World Economic Forum. Even though it's virtual, the metaverse does actually impact the environment. 2022. URL: https://www.weforum.org/agenda/2022/02/how-metaverse-actually-impacts-the-environment/ (accessed on: 11.08.2022).

Table 6

Structure of the Metaverse

Unit		Unit levels	
Content and experience	Content: enriches the metaverse experience, including content from the developer, creator, users, etc.	Applications: tied to specific uses of the metaverse (training, collaborative work, activities, etc.)	Virtual worlds: environments in which large numbers of users can collect, interact, create, and move different events
Platforms	Access and discovery: platforms that facilitate the distribution and discovery of content, experiences, apps, including browsers, search/ visual search, app shops, app showcases	3D authoring platforms: a core set of tools and platforms for creating 3D applications, including design, game engines, AI services, authoring tools	
Infrastructure and hardware	Devices, OS, and accessories: device hardware, components, accessories/peripherals, and OS layers that are part of the human interface	Infrastructure: underlying infrastructure in the cloud, semiconductors, networks, etc. that keep the metaverse running	
Means of implementation	Security, privacy, and governance: security, identity and data management platforms, content moderation	Identification: platforms that manage digital authentication, avatars, and social graphs	Payments and monetisation: platforms and tools (e.g., advertising) to create a metaverse economy

Source: URL: https://www.mckinsey.com/business-functions/growth-marketing-and-sales/our-insights/value-creation-in-the-metaverse

97% in June 2022 from its November peak ($ 8 million and $ 229 million respectively).[14] In this context, in order to better understand the role of the metaverse concept in the life of society and state, it seems reasonable to assess the prospects for its evolution from different perspectives and over different time horizons.

Given the high speed of the digital transformation of the economy, it seems critical to gauge public attitudes towards the concept of the metaverse. Thus, according to a survey of 1,007 respondents conducted by the Tidio blog, among the main reasons to join the metaverse are work opportunities (52%), art and live entertainment "on air" (48%), and monetary investments (NFT[15] and cryptocurrency trading) (44%). At the same time, almost 77% of respondents believe that the metaverse could cause serious harm to modern society. Addiction to simulated reality (47%), privacy issues (41%) and mental health (41%) are cited as major threats. However, almost 46% are convinced that 10 years after the creation of the metaverse, mostly humans will be living and coexisting in it.[16]

D. Garon points out that an important factor influencing the development of the metaverse is the emergence of a generation that has grown up in the virtual world [9, p. 3]. According to Pew Research Center's online survey of 1,316 American teenagers, aged 13 to 17, the vast majority of them have access to digital devices such as smart phones (95%), desktop or laptop computers (90%) and games consoles (80%). The number of daily internet users among respondents has increased from 92% in 2014–2015 to 97% currently. The proportion of teenagers who say they are almost constantly online has doubled since 2014–2015 (from 24% to 46%). In addition, the proportion of respondents who say they use the internet almost all the time has also increased (from

[14] TheRealDeal. Metaverse land prices down 80% in six months. 2022. URL: https://therealdeal.com/2022/08/04/metaverse-real-estate-gets-reality-check/ (accessed on: 15.08.2022).

[15] NFTs play a big role in drawing attention to metaverse. For example, Nike acquired startup RTFKT, which produces unique virtual trainers and digital artefacts using NFT, blockchain-based authentication and augmented reality. URL: https://www.techtarget.com/whatis/feature/The-metaverse-explained-Everything-you-need-to-know (accessed on: 15.08.2022).

[16] Tidio. Metaverse: Would You Remain Yourself in a Virtual World? 2022. URL: https://www.tidio.com/blog/metaverse/ (accessed on: 15.08.2022).

24% to 46%). YouTube is the most popular social platform among respondents (95%), followed by TikTok (67%), Instagram (62%) and Snapchat (59%). Note that there has been a sharp decline in the use of Facebook (32%, down from 71% in 2014–2015).[17]

The RuGenerations research centre in 2021, based on a study conducted in the format of online group interviews with young people of the borderline Y, Z generations (born in 1999–2005) from Russia and Kazakhstan, concluded that they have the following characteristics:

- content and switching between different content is more important than its duration;
- the choice of content depends largely on the recommendations they trust;
- live streaming is popular with them;
- voluntary donations to content creators are widespread;
- viewing content is often combined with the consumption of food.[18]

It seems crucial for states and organizations to take these characteristics into account when designing and implementing their development strategies.

In this context, it seems logical to develop new user interfaces that change the format of communication and make access to information increasingly barrier-free (e.g., through the creation of neural interfaces). The strategic goal is to enable the seamless movement of people and assets between the metaverse and the physical world, potentially only possible through close interaction between corporations operating in the virtual and physical worlds. This approach implies enormous economic potential, which could not only facilitate the creation of new corporations, products, and services, but also change the way resources are allocated and monetised.

CONCLUSIONS AND RECOMMENDATIONS

At present, the metaverse concept is at the nascent stage and is significantly influenced by various factors (quality of research, ICT development, regulatory frameworks, customer experience, etc.). Its creation and establishment will require significant improvement of the existing infrastructure, scaling of technological development and computing power, creation of new user experience and development of standards for metaverse management.[19]

Given the high level of uncertainty and the scale of change to come, such a process is a multifaceted task. Therefore, for strategic development and identification of potential risks, corporations are advised to:

1. Review the specifics of developing virtual worlds in the context of the corporation's business strategy and business model at the board of directors' level.
2. Identify potential areas of corporate development in virtual worlds and platforms for collaboration.
3. Identify and rank the risks of the corporation in the virtual space.
4. Evaluate the economic feasibility of participating in projects in the virtual environment and their relationship to the physical world.
5. Increase the level of competencies and skills of the corporation's employees in the digital economy.

The development potential of the metaverse allows an infinite number of parallel worlds to be created simultaneously, radically

[17] Pew Research Center. Teens, social Media and Technology 2022. 2022. URL: https://www.pewresearch.org/internet/2022/08/10/teens-social-media-and-technology-2022/ (accessed on: 15.08.2022).

[18] Rugenerations. Generation Z: Streaming, donation and clipboard thinking 2021. URL: https://rugenerations.su/2021/1-2/02/%d0%bf%d0%be%d0%ba%d0%be%d0%bb%d0%b5%d0%bd%d0%b8%d0%b5-z-%d1%81%d1%82%d1%80%d0%b8%d0%bc-%d0%b4%d0%be%d0%bd%d0%b0%d1%82-%d0%b8-%d0%ba%d0%bb%d0%b8%d0%bf%d0%be%d0%b2%d0%be%d0%b5-%d0%bc%d1%8b%d1%88/ (accessed on: 15.08.2022)

[19] The creation of the Metaverse Standards Forum to develop the interoperability standards needed to create an open metaverse can be seen as an important step in this direction. URL: https://metaverse-standards.org/ (accessed on: 15.08.2022).

transforming our everyday lives. In this regard, their progressive emergence can go in different directions, and the forecasts should only be considered as potential vectors of development of this market segment. It seems that in the medium-term evolution in this area will follow the path of creation of separate virtual worlds by large technological corporations and states,[20] which at some stage will have to cooperate with each other and ensure compatibility of systems and technologies in order to form a single metaverse or multiverse based on a hybrid governance model combining both centralized and decentralized approaches.

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The development potential of the metaverse allows an infinite number of parallel worlds to be created simultaneously, radically transforming our everyday lives. In this regard, their progressive emergence can go in different directions, and the forecasts should only be considered as potential vectors of development of this market segment. It seems that in the medium-term evolution in this area will follow the path of creation of separate virtual worlds by large technological corporations and states,[22] which at some stage will have to cooperate with each other and ensure compatibility of systems and technologies in order to form a single metaverse or multiverse based on a hybrid governance model combining both centralized and decentralized approaches.

[20] In February 2022, the South Korean government announced $ 187 million in funding for the national project to create an "Expanded Virtual World" metaverse ecosystem. URL: https://cointelegraph.com/news/south-korea-to-invest-187m-in-national-metaverse (accessed on: 15.08.2022).

[21] The creation of the Metaverse Standards Forum to develop the interoperability standards needed to create an open metaverse can be seen as an important step in this direction. URL: https://metaverse-standards.org/ (accessed on: 15.08.2022).

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Global Value Chains of Asia-Pacific Area: State and Corporate Sector

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ABSTRACT

The paper presents an analysis of the dynamics results, structure and nature of the participation of the countries of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership in global value chains. The analysis result revealed trends that took shape in international production in the 20th century. It has been determined a higher involvement in the international division of labor characterizes that the developing countries of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership. The study shows that, despite high involvement of the developing countries of the Agreement in global value chains, they act more than suppliers of resources, as well as assembly points, while participation leads to the consolidation of their technological backwardness. Based on the analysis of the countries cost taking part in the partnership for R&D, it was determined that in developed countries, the internal functions of the state are gradually being transferred in terms of supporting and developing science in favor of the corporate sector. The authors concluded this trend contributed to the monopolization of scientific and technological achievements sphere by the corporate sector and the formation of oligopolies from a limited number of technology giant corporations.

Keywords: value chains; APAC; mega-regional trade agreements; Comprehensive and progressive agreement for Trans-Pacific Partnership; corporate sector; MNC; TNC

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INTRODUCTION

With the development and deepening of the international division of labour, the phenomenon of value chains has gained importance in the global economy. Participation in value chains allows countries to integrate into the world economy according to the capabilities of their national economies (and, as a consequence, to avoid peripheral autarchy i.e., self-sufficiency or closed economy) and contributes — to a greater or lesser extent — to their social and economic development.

The issue of studying the development, functioning and transformation of value chains occupies an important place in the reports of international organizations and research institutes, works of foreign researchers and Russian scientists.

The topical area of value-added chains is thoroughly studied and examined in the works by A. V. Kuznetsov [1], V. V. Perskaya [2], N. A. Volgina [3], etc. Foreign researchers include G. Linden, J. Dedrick, K. Kramer [4], D. Somers, R. Belderbos [5], K. Kohn, C. Jiang [6], etc.

However, the study of the nature of interaction between the state and the corporate sector in the development and spread of the phenomenon of global value chains, as well as the place of the corporate sector in global value chains is fragmented and not fully reflected in the scientific literature. This makes the current study relevant.

The purpose of the study is to identify the nature of interaction between the state and the corporate sector in the development and diffusion of the global value chain phenomenon, using the Asia-Pacific region as a case study.

In order to achieve this objective, the following tasks were identified and solved:

1. The dynamics was analyzed, as well as the structure and nature of Asia-Pacific countries' participation in global value chains, using the Comprehensive and Progressive Agreement for Trans-Pacific Partnership as an example.

2. The role and importance of the corporate sector in global value chains was identified.

THE METHODOLOGY OF THE RESEARCH BEING CARRIED OUT

The methodology of the current study is based on the analysis of the following data:

- Country Participation Index in Global Value Chains, World Bank database — World Integrated Trade Solution (WITS).
- Share of value added in country exports, World Bank database — World Integrated Trade Solution (WITS).
- Countries' socio-economic indicators, World Bank, and International Labour Organization statistics.
- Countries' share of total world value added in medium- and high-tech industries, statistics by National Science Foundation (NSF).
- Countries' R&D expenditure, UNESCO Institute for Statistics statistical information.
- Ranking of the world's largest non-financial corporations by overseas assets, UNCTAD's (United Nations confederation on Trade and Development) annual Report — World Investment Report.

COUNTRIES PARTICIPATING IN THE COMPREHENSIVE AND PROGRESSIVE AGREEMENT FOR TRANS-PACIFIC PARTNERSHIP IN GLOBAL VALUE CHAINS: DYNAMICS AND STRUCTURE

Both developed and developing countries of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership are active participants in global value chains (hereinafter referred to as GVCs). However, an analysis of the dynamics and

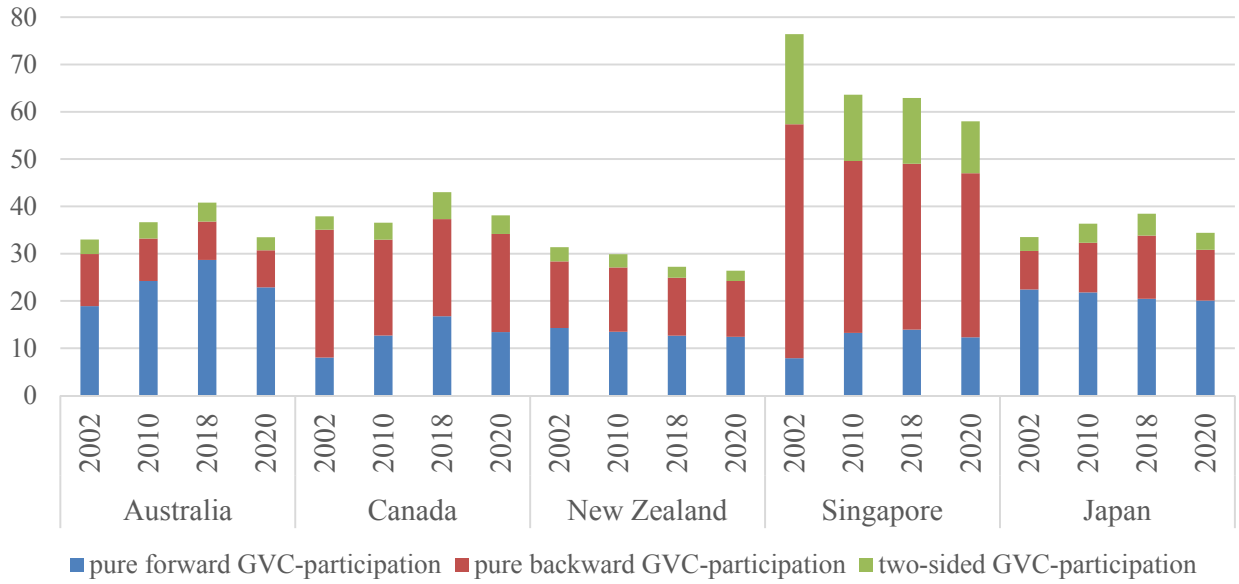

Fig. 1. **Index dynamics of developing countries' participation of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership in global value chains, %, 2002–2020**

Source: compiled by the authors based on World Integrated Trade Solution (WITS) data. URL: https://wits.worldbank.org/gvc/gvc-data-visualization.html

pattern of participation of the countries in the partnership in question identified the following trends:

1. Between 2002 and 2020, the trend towards shifting production capacity from developed to developing markets is clearly evident.

For example, in 2002, the developed country participation index in GVCs averaged 33% (*Fig. 1*) and was comparable to the average developing country participation index in GVCs of 35% (*Fig. 2*).

By 2020 there was a shift in favour of developing countries' partnerships (taking into account the global supply chain crisis of 2021–2022, the first symptoms of which were already evident in 2020). Two decades later, the value of the developed-country partnership index in GVCs has averaged 31% (*Fig. 1*), while the average value of the developing-country partnership index in GVCs has averaged 44% (*Fig. 2*). The global GDP volume over the period under consideration increased from USD $ 34.9 trillion in 2002 to USD $ 84.9 trillion by 2010.[1]

2. Between 2002 and 2020, there is a clear trend towards a changing pattern of developing countries' participation in GVCs.

For example, for the developing countries of the partnership, an increasing share of net inverse participation in GVCs has become a feature by 2020 (*Fig. 2*). In other words, the trend for the developing countries under consideration is towards greater involvement in the production process at the final stages of production, with continued export of output to end-use consumer markets.

This trend can be attributed to the qualitative transformation of value chains due to technological advances and the digital transformation of the global economy [7]. One of the results of the transformation of the production process

[1] The World Bank website. URL: https://databank.worldbank.org/ (accessed on: 15.09.2022).

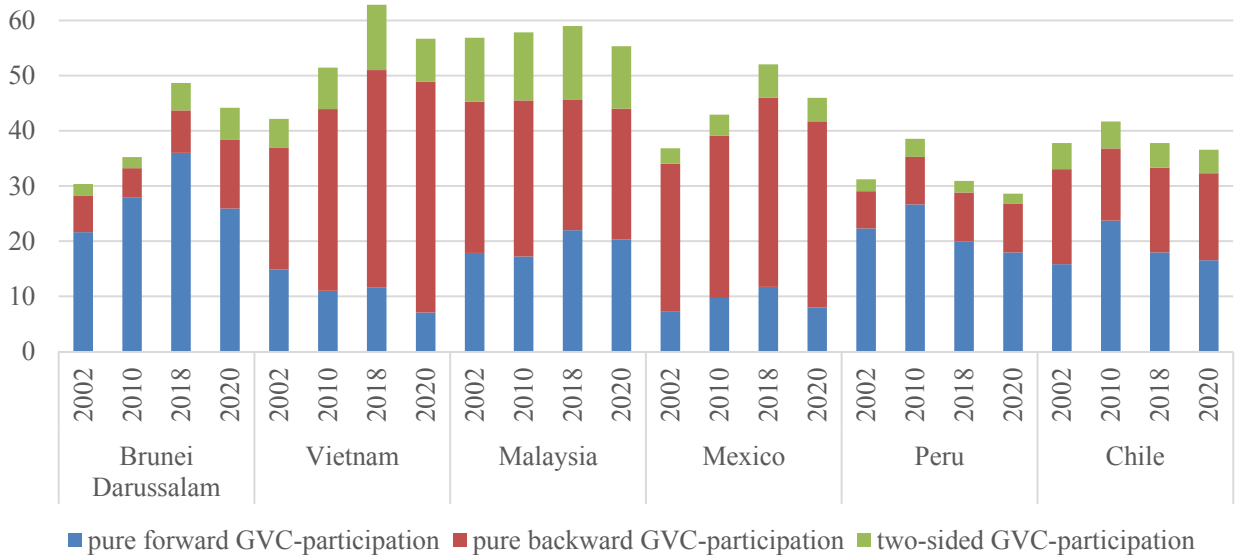

Fig. 2. **Index dynamics of developing countries' participation of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership in global value chains, %, 2002–2020**

Source: compiled by the authors based on World Integrated Trade Solution (WITS) data. URL: https://wits.worldbank.org/gvc/gvc-data-visualization.html

within GVCs in general, as well as the increasing technological complexity of final products in particular, is the corporate sector's desire to adapt technologies, production processes and products according to the requirements of the target consumer, whereby the corporate sector tends to localize the various stages of the production process within the entire chain length (including individual R&D stages [5]) in close proximity to the target customer market.

Thus, the analysis of the dynamics and patterns of participation of the partnership countries in the GVCs identified that the developing countries of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership are characterized by a higher degree of involvement in the international division of labour.

An analysis of the share of value added in the export structure of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership's countries reveals that in the developing countries, value added is mostly generated in the extractive (Brunei Darussalam, Chile, Peru) and manufacturing (Chile, Malaysia, Mexico, Peru, Vietnam) industries (*Table 1*).

In the developed economies, in turn, the value-added is predominantly created in the manufacturing and services sectors (*Table* 2). The exceptions are Australia and Canada, for which the extractive industries are significant contributors to value added, due to the specific nature of their economies.

Thus, it can be assumed that while the developing countries participating in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership have a high degree of involvement in the GVCs, they act more as suppliers of resources, including relatively less skilled and cheaper labour (*Table* 3), and as "assembly points", both for the corporate sector in the developed countries and for China.

This assumption is supported, inter alia, by conclusions drawn from an analysis of the share of value added by the countries in question in total world value added in the

Table 1

Share of value added in the exports structure of developing countries participating in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, %, 2020

The format for participation in the GVCs	Mining and Quarrying	Manufacturing	Services	Agriculture, forestry and fishing	The energy sector
Brunei Darussalam					
Pure forward GVC-participation	86.96	9.43	3.18	0	0.32
Pure backward GVC-participation	75.19	11.49	11.86	0.03	0.47
Two-sided GVC-participation	78.65	9.36	10.6	0	0.82
Vietnam					
Pure forward GVC-participation	0	79.27	12.63	7.6	0.02
Pure backward GVC-participation	0	90.02	5.23	4.12	0
Two-sided GVC-participation	0	90.65	4.76	4.25	0
Malaysia					
Pure forward GVC-participation	12.01	74.31	12.23	1.15	0.18
Pure backward GVC-participation	1.48	91.81	5.65	0.66	0.16
Two-sided GVC-participation	1.7	93.28	4.52	0.32	0.1
Mexico					
Pure forward GVC-participation	22.54	66.27	8.44	2.6	0
Pure backward GVC-participation	1.12	95.85	0.86	2.16	0
Two-sided GVC-participation	4.12	93.44	1.63	0.77	0
Peru					
Pure forward GVC-participation	37.92	40.44	12.65	8.87	0.01
Pure backward GVC-participation	15.81	65.08	14.08	4.03	0
Two-sided GVC-participation	29.49	56.69	9.4	3.82	0
Chile					
Pure forward GVC-participation	23.4	47.2	20.51	8.69	0.08
Pure backward GVC-participation	6.56	64.75	19.2	9.13	0.09
Two-sided GVC-participation	22.55	58.41	13.92	4.99	0.06

Source: compiled by the authors based on World Integrated Trade Solution (WITS) data. URL: https://wits.worldbank.org/gvc/gvc-data-visualization.html

Table 2

Share of value added in the exports structure of developed countries participating in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, %, 2020

The format for participation in the GVCs	Mining and Quarrying	Manufacturing	Services	Agriculture, forestry and fishing	The energy sector
Australia					
Pure forward GVC-participation	62.39	17.9	14.13	5.4	0.13
Pure backward GVC-participation	39.75	42.45	10.97	6.63	0.04
Two-sided GVC-participation	44.98	41.12	8.74	5.02	0.08
Canada					
Pure forward GVC-participation	34.22	39.46	17.92	7.82	0.45
Pure backward GVC-participation	9.28	78.33	7.31	4.63	0.22
Two-sided GVC-participation	18.49	67.92	7.16	6.19	0.12
New Zealand					
Pure forward GVC-participation	1.07	63.84	24.47	9.95	0.3
Pure backward GVC-participation	0.27	59.7	20.32	6.54	0.11
Two-sided GVC-participation	0.4	67.69	15.4	6.43	0.08
Singapore					
Pure forward GVC-participation	0	52.69	47.11	0.02	0.01
Pure backward GVC-participation	0	56.35	43.38	0.01	0.01
Two-sided GVC-participation	0	58.22	41.67	0.01	0.01
Japan					
Pure forward GVC-participation	0.1	77.04	22.46	0.22	0
Pure backward GVC-participation	0.12	90.4	8.78	0.25	0.05
Two-sided GVC-participation	0.24	91.12	8.31	0.16	0

Source: compiled by the authors based on World Integrated Trade Solution (WITS) data. URL: https://wits.worldbank.org/gvc/gvc-data-visualization.html

Table 3

Socio-economic indicators of countries participating in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, 2020

Country	Country ranking in the Human Development Index	The Human Development Index indicator	Minimum monthly wage, US dollars	Average monthly wage, US dollars
Developed countries				
Australia	16	0.77	2246.2	3874.3
Canada	5	0.80	1550.9	3504.4
New Zealand	13	0.78	1716.7	3373.1
Singapore	1	0.88	N/A	3286.1
Japan	3	0.80	1349.8	2881.8
Developing countries				
Brunei Darussalam*	56	0.63	N/A	1651.3
Vietnam	38	0.69	190.4	296.6
Malaysia	62	0.61	265.5	697.8
Mexico	61	0.63	N/A	328.3
Peru	65	0.61	278.7	720.8
Chile	47	0.65	N/A	1151.5

* *Note:* For Brunei the most actual publicly available data is in 2014.

Source: compiled by the authors according to the World Bank. URL: https://openknowledge.worldbank.org/bitstream/handle/10986/34432/9781464815522.pdf?sequence=4&isAllowed=y; International Labor Organization. URL: https://ilostat.ilo.org/data/

medium-high intensive industries and high-tech sectors of the economy.[2]

Thus, between 2002 and 2018 the developing countries of the partnership accounted on average for no more than 0.5% of the total value added in medium-high intensive industries in the IT services sector (versus 17% for the developed countries), 3% in chemicals and chemical products (versus 11.5% for the developed countries), 1% in machinery and equipment manufacturing (versus 20% for the developed countries), 3.5% in motor vehicles manufacturing (versus 20% for the developed countries), 7% in defense industry (versus 12% for the developed countries) (*Fig. 3*).

In turn, in terms of value added in high-tech industries from 2002 to 2018, the developing countries of the partnership accounted on average for no more than 0.5% of total value added in air and spacecraft machinery (versus 9% for the developed countries), 1% in pharmaceuticals (versus 13% for the developed countries), 4% in computing, electronic and optical devices (versus 20% for the developed

[2] According to the OECD (Organisation for Economic Co-operation and Development) classification, medium-high intensive industries include: motor vehicles; IT services; defense industry; railroad, military vehicles and other transport; machinery and equipment; medical equipment; electrical equipment; and chemicals and chemical products. High-tech industries include: air and spacecraft machinery; research and development; software publishing; manufacturing of computing, electronic and optical products; manufacturing of pharmaceutical products (author's note).

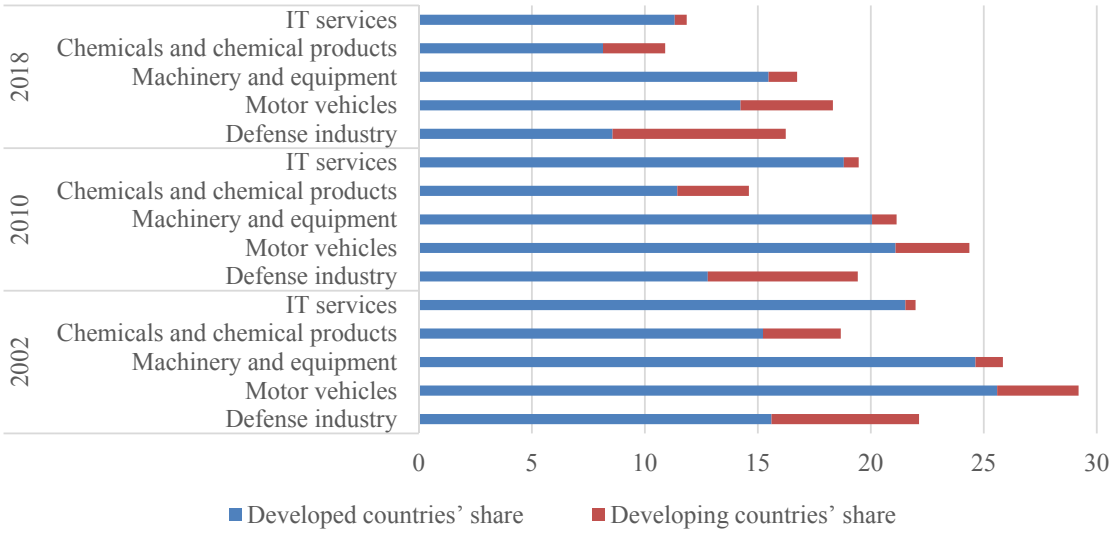

Fig. 3. **Dynamics of the value added share of the countries participating in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership in the total world volume of value in medium-high intensive industries of the economy, %, 2002–2018***

* *Note:* the most actual publicly available data.

Source: compiled by the authors based on data from the National Science Foundation (NSF). URL: https://ncses.nsf.gov/pubs/nsb20205/data#table-block

countries), 2% in R&D (versus 10% for the developed countries), 0.7% for software publishing (versus 9% for the developed countries) (*Fig. 4*).

These data suggest that most of the value added of the developing countries under consideration is generated in the low-tech sectors of the economy. At the same time, the national economies of the developing countries of the partnership are shaped by an extensive model: through the exploitation of natural and human resources. Thus, despite the high degree of participation of the developing countries in the international production under GVCs, the quality of such participation leads to the perpetuation of their technological lag.

THE CORPORATE SECTOR IN GLOBAL VALUE CHAINS: FEATURES AND TRENDS

As of today, according to an UNCTAD report,[3] more than 60% of world trade is value-added. In this context, the participation of countries in value chains (irrespective of the nature of this participation) allows them to avoid peripheral autarky and contributes to socio-economic development — to a greater or lesser extent.

However, as well as the advantages for the states, the deepening and development of the international division of labour has significant disadvantages. In the context of GVC, a significant share of countries' GDP is generated by the revenues of the corporate sector (to a greater extent, — its largest representatives, multinational corporations) and, therefore, is not allocated in favour of the development of state economies [1]. It should be noted, however, that this trend is true for all actors in each link of the value chain: both for developing countries that act as suppliers of cheap natural and human resources, and for developed countries that provide, inter alia, access to highly skilled specialists and established research and technological infrastructure [8].

[3] World Investment Report 2013: Global Value Chains: Investment and Trade for Development. URL: https://unctad.org/system/files/official-document/wir2013_en.pdf (accessed on: 20.02.2022).

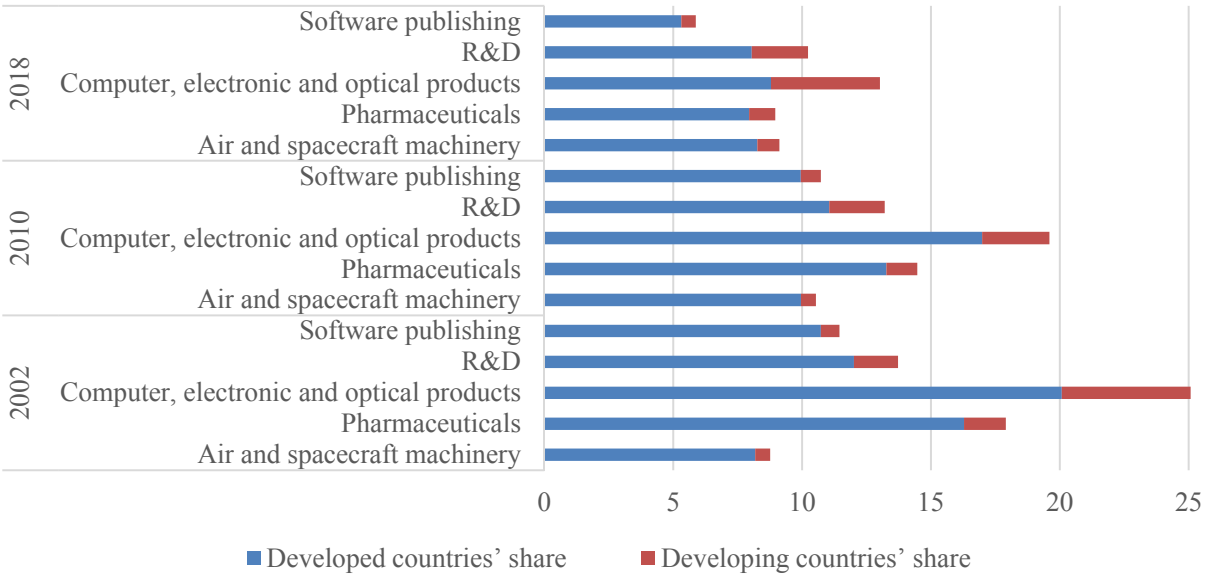

Fig. 4. **Dinamics of value added share of the countries participating in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership in the total world volume of value in high-tech sectors of the economy, %, 2002–2018***

* *Note:* the most actual publicly available data.

Source: compiled by the authors based on data from the National Science Foundation (NSF). URL: https://ncses.nsf.gov/pubs/nsb20205/data#table-block

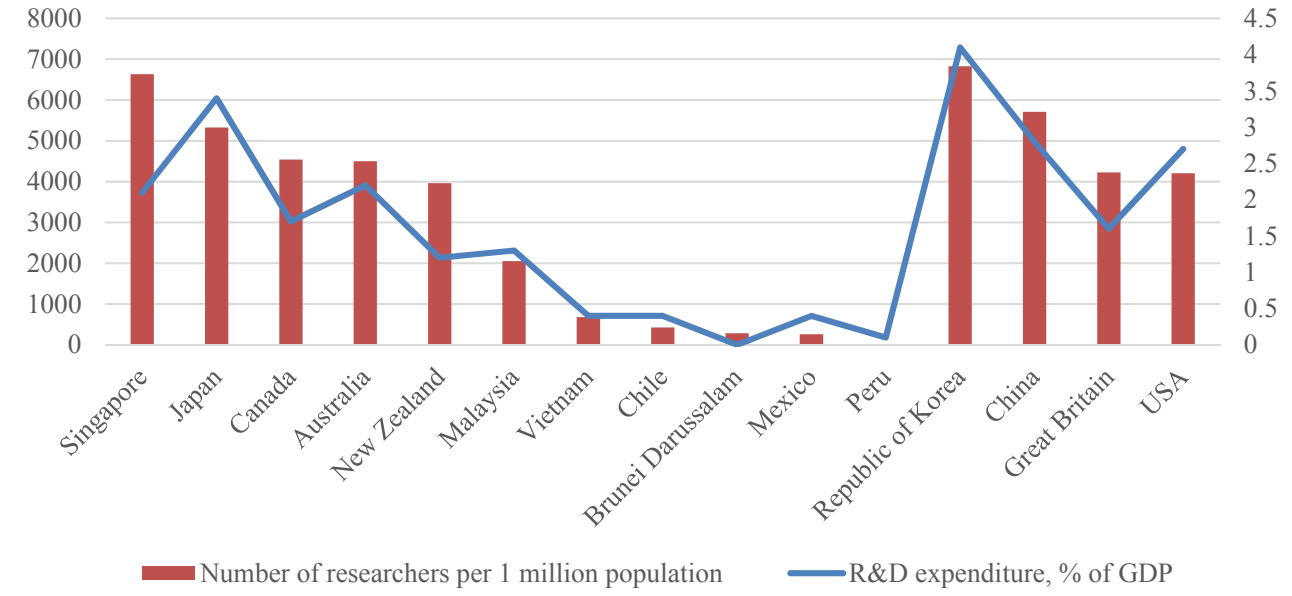

Fig. 5. **R&D spending and number of researchers per 1 mln population of current and potential participants in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, 2019**

Source: compiled by the authors based on data from the UNESCO Institute for Statistics. URL: http://data.uis.unesco.org/

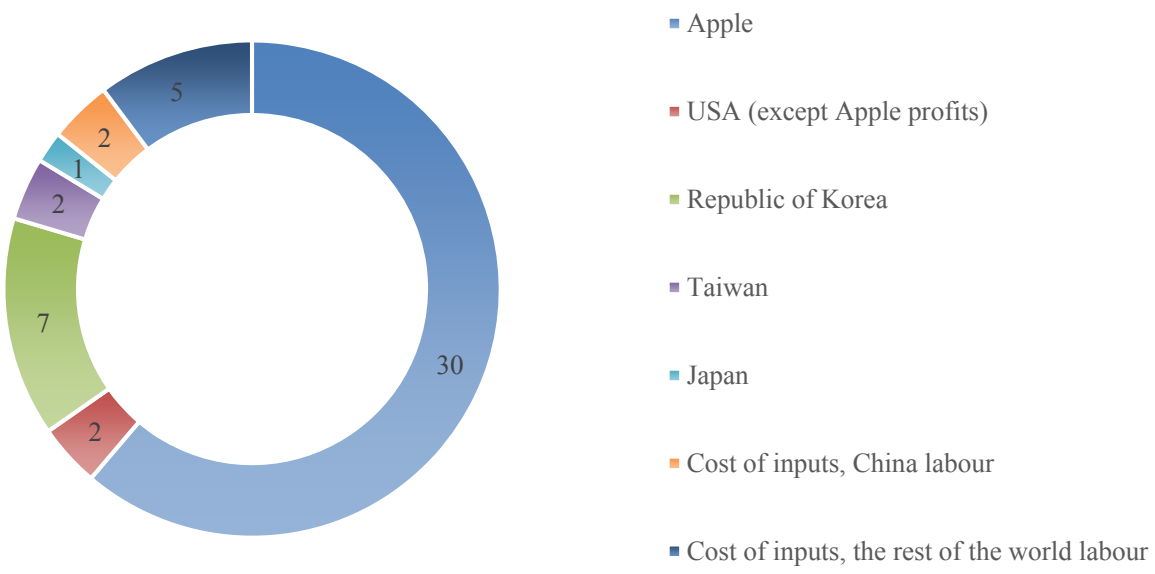

Fig. 6. **Profit spreading received as a result of the sale of the *iPad* between the participants in the production process, %**

Source: compiled by authors based on URL data: https://webzoom.freewebs.com/phsworldhistory/AP%20WH%20Unit%20V/Value_iPad_iPhone.pdf

This trend has been shaped by many factors, one of which is the amount of R&D expenditure by governments (*Fig. 5*) and the participation of the corporate sector in government R&D expenditure.

As of 2019, the corporate sector's share of total public R&D expenditure for the developed countries in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership averaged 59%, while for the developing countries the figures averaged around 23%.[4] Thus, in developed countries, there has been a gradual transfer of domestic government functions to the corporate sector to support and promote science. This trend is conducive to the corporate sector monopolising the field of S&T (science and technology) advances and the formation of oligopolies of a limited number of giant technology corporations. Due to the almost exclusive rights to intellectual property (R&D results), the corporate sector is the key beneficiary of technological rents.

For example, in 2011, a group of scientists from the United States conducted a study to analyse the distribution of profits derived from the sale of products among the participants in the production process [4]. They analysed Apple's products: the iPad, a model with Wi-Fi and 16GB memory, with a minimum retail price of USD 499 at the time of the study; the iPhone 4, a minimum retail price of USD 549 at the time of the study. The products in question were ultimately assembled in China. According to the study, Apple accounted for 30% of total profits from iPad sales (*Fig. 6*) and 59% of total profits from iPhone 4 sales (*Fig. 7*).

Thus, in today's context, ownership of technology and exceptional knowledge determines one's place in the hierarchy of the global economy. Multinational corporations (MNCs) with key technologies, as well as the capacity to continuously update technologies and generate new

[4] UNESCO Institute for Statistics website. URL: http://uis.unesco.org/apps/visualisations/research-and-development-spending/ (accessed on: 03.04.2022).

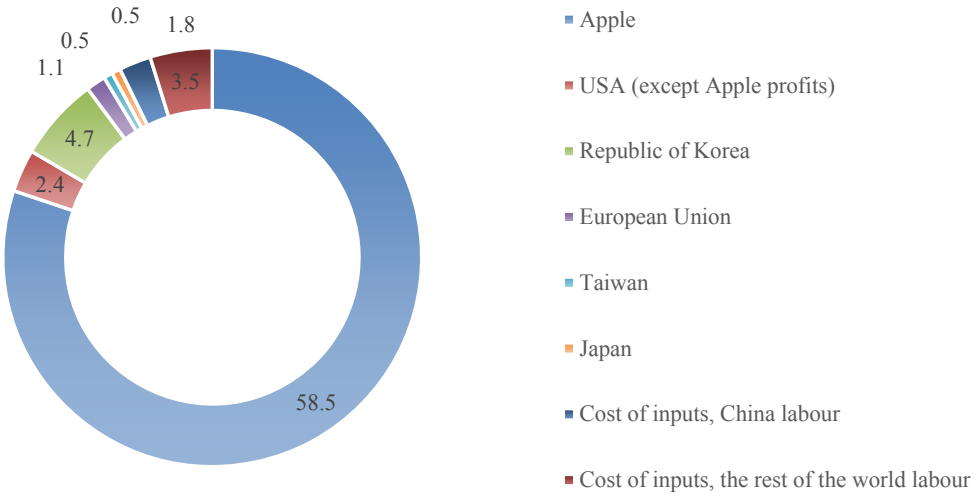

Fig. 7. **Profit spreading received as a result of the sale of the *iPhone 4* between the participants in the production process, %**

Source: compiled by authors based on URL data: https://webzoom.freewebs.com/phsworldhistory/AP%20WH%20Unit%20V/Value_iPad_iPhone.pdf

knowledge, are the key beneficiaries in the context of GVCs (*Fig. 8*).

The potential for participation in international production on a medium- and high-tech basis is increasing competition from a number of developing countries,[5] whose governments are designing strategies and reforming national economies to transform production and develop high-tech industries, as well as the corporate sector in developing countries. In particular, the corporate sector in China has seen an upward trend in R&D expenditure in recent years [6], as reflected in the evolution of China's value added in the medium-high intensive industries and high-tech sectors of the economy (*Fig. 9*).

In addition, China's corporate sector is rapidly strengthening its position on the global stage, competing with the established leaders,— the multinationals of the developed world. According to the

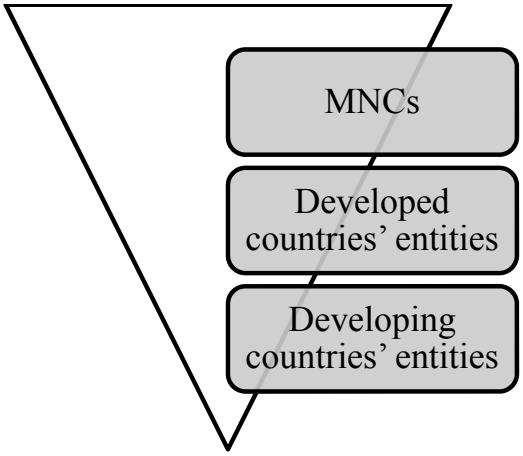

Fig. 8. **Schematic representation of the income spreading between participants in the production process within global value chains**

Source: compiled by the authors.

data published annually by UNCTAD as part of the World Investment Report, in 2016 the list of the world's top 100 non-financial corporations by foreign assets included 4 corporations from China: CK Hutchison Holdings Ltd — ranked 19th, Hon Hai Precision Industries — ranked 40th, China National Offshore Oil Corp —

[5] Predominantly from the Asia-Pacific region, in particular the PRC (China) and India.

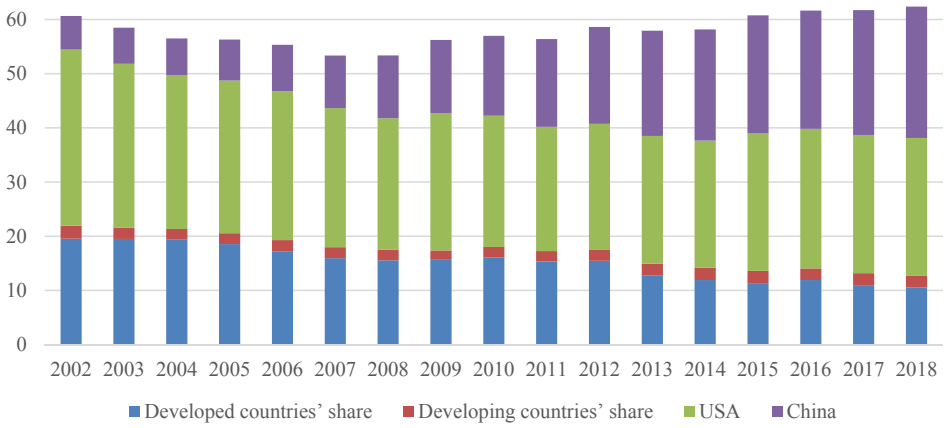

Fig. 9. **The value added share of the countries participating in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, the USA and China in the total world volume of value added in medium-high and high-tech sectors of the economy, %, 2002–2018***

* *Note:* the most actual publicly available data.

Source: compiled by the authors based on data from the National Science Foundation (NSF). URL: https://ncses.nsf.gov/pubs/nsb20205/data#table-block

ranked 44th, China COSCO Shipping Corp Ltd — ranked 81st.[6] The prevailing role was occupied by the US (22 multinationals), Great Britain (16 multinationals) and Japan (11 multinationals).

By 2021, China's corporate sector had considerably overtaken the established leaders: there were already 12 Chinese multinationals representing various industries, including the high-tech ones, in the list of top 100 global non-financial corporations by foreign assets (*Table 4*). Multinationals from the US took 20 ranking positions, those from the UK — 11, and those from Japan — 9.

Such activity on the part of the developing countries, particularly the China, has challenged the corporate sector in the developed countries to suppress increasing competition and raise barriers to market entry for the corporate sector in the developing countries. One of the instruments to ensure the competitiveness of the developed countries and their corporate sector has been the implementation in the Asia-Pacific region of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, which has set new standards for global trade and international economic relations.

CONCLUSIONS

Today, with the development and spread of the GVCs, the need for countries to participate in these chains is beyond doubt, as it contributes to the social and economic development of states and avoids existence within a peripheral autarchy.

However, the dominant positions in the global economic hierarchy in the context of this phenomenon are occupied by multinationals of the developed countries and directly by developed countries themselves. This state of affairs has been shaped by a variety of factors, with one of the key ones being the developed scientific and technological infrastructure and the technological diktat of the developed countries' multinationals.

[6] Website Topforeignstocks.com. URL: https://topforeignstocks.com/2017/06/12/the-worlds-top-100-non-financial-mnes-by-foreign-assets-2016/ (accessed on: 27.09.2022).

Table 4

China's corporate sector in the ranking of the 100 largest non-financial MNCs in the world in terms of foreign assets, 2021

Ranking place	Name	Industry	Territorial affiliation
14	CK Hutchison Holdings Ltd	Retail Trade	Hong Kong, China
18	China National Petroleum Corp (CNPC)	Mining, quarrying and petroleum	China
24	Hon Hai Precision Industries	Electronic components	Taiwan Province of China
30	Tencent Holdings Ltd	Computer and Data Processing	China
45	Sinopec — China Petrochemical Corp	Petroleum Refining and Related Industries	China
47	China COSCO Shipping Corp Ltd	Transport and storage	China
54	China National Offshore Oil Corp (CNOOC)	Mining, quarrying and petroleum	China
55	Huawei Investment & Holding Co Ltd	Communications equipment	China
76	Sinochem Group	Mining, quarrying and petroleum	China
83	China National Chemical Corp (ChemChina)	Chemicals and Allied Products	China
88	Legend Holdings Corp	Investment Services	China
100	State Grid Corp of China	Electricity, gas and water	China

Source: compiled by the authors according to UNCTAD. URL: https://worldinvestmentreport.unctad.org/annex-tables/

However, as the experience of China shows, well-constructed interaction between the state and the corporate sector [9], transformation of production (both development of high-tech industries and support of national high-tech companies) can help include the country into higher stages of value chains. At the same time, it should be taken into account that a country's potential for inclusion into value chains will also depend on the degree of its involvement in integration processes.

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Anti-Russian Sanctions Impact: Aftermath of a Reduction in Foreign Trade and Production Growth in the Russian Federation

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ABSTRACT

There are technological, economic, transport links in the production, storage and delivery of goods in the contemporary economy. Therefore, the appearance of a new or an increase in the volume of production of an existing product requires changes in the production of other products, linked with this one through the technological chains. Statistical data and models of input-output balance allow us to trace such chains of connections and calculate the volumes production of different goods. This paper contains the results of a study of intersectoral chains of influence of bans and restrictions imposed on Russian exports. The study shows the reduction in the export of some goods has a negative effect on the output of a number of other goods. The decrease in imports has a similar effect. The author also shows calculations' results of the growth impact on the output of different goods and services on changes in the scale of other types of goods production and services in the Russian economy.

Keywords: cross-industry relations; exports; imports; volume of goods and services production; input-output balance; growth rates ratio

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IMPACT OF THE EXPORT AND IMPORT BAN ON RUSSIAN OUTPUT

Large-scale anti-Russian sanctions imposed by countries unfriendly to the Russian Federation[1] prohibit the export of a wide range of Russian goods[2,3] [1]. Foreign researchers differ in their assessment of the impact of barriers, prohibitions, and restrictions on Russia's foreign trade on gross domestic product, gross value added and output of individual products in the Russian Federation [2–6].

Taking into account the inter-industry relations existing in the economy of the Russian Federation, let us estimate the production of which products would be affected by a decrease in exports of ten domestic products. The estimate is based on the data of the intersectoral balance of the Russian Federation for 2019, presented on the website of the Federal State Statistics Service of the Russian Federation (Rosstat).[4] It contains 61 products (OKPD 2) and 61 industries (OKVED 2).

[1] The list of foreign states and territories committing unfriendly acts against Russia was approved by RF Government Decree No. 430-d of 05.03.2022. URL: http://publication.pravo.gov.ru/Document/View/0001202203070001; URL: http://government.ru/docs/46080/; The Government has expanded the list of unfriendly foreign states. Decree of the Government of the Russian Federation of 20.07.2022 No. 1998-d. URL: http://government.ru/docs/46080/; The government has added to the list of countries and territories unfriendly to Russia. URL: https://tass.ru/politika/16196295?utm_source=yxnews&utm_medium=desktop

[2] URL: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_4548

[3] URL: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/international-relations/restrictive-measures-sanctions/sanctions-adopted-following-russias-military-aggression-against-ukraine_en

[4] URL: https://rosstat.gov.ru/statistics/accounts (accessed on: 20.05.2022).

The products and services with a significant share of exports in the volume of their production, presented by Rosstat in the "Table of Domestic Product Use at Basic Prices for 2019", which are subject to numerous bans and restrictions imposed by countries unfriendly to Russia, were selected for analysis (*Table 1*).

Inter-sectoral linkages were estimated for the reduction of exports of the seven products and services presented in Table 1 (products of mining industries; coke and oil products; chemicals and chemical products; vehicles and equipment, other; finished metal goods, except for machinery and equipment; air and space transport services), as well as exports of agriculture and hunting, food, drinks and tobacco products, land, and pipeline transport services. Each export was reduced by 10 per cent and reductions were calculated for all other products and services (59 items). It was assumed that in each calculation only one group of products and services decreased in exports.

The calculations showed that in the 2019 inter-industry relationships, the largest drop in exports and gross utilised product in Russia occurs when exports of mining and quarrying products decrease. These maximum values are taken as 100%.[5] A fall by the same relative value of Russia's basic metals exports reduces total Russian exports by 35.7 p.p. and gross utilised product by 31.8 p.p. less than a fall in mining and quarrying exports (100.0–64.3 = = 35.7; 100.0–68.2 = 31.8). Of the products shown in *Table 2*, the smallest decrease in exports of air and space transport services was observed, 19.1% and 19.5% respectively, compared to a decrease in exports of mining and quarrying products.

The products in question are ranked in the following order by the drop in total output (from maximum — to minimum):

- Mining and quarrying products;
- Coke and refined petroleum products;
- Basic metals;
- Foodstuffs, beverages and tobacco products;
- Chemicals and chemical products;
- Means of transport and equipment, and other vehicles;
- Land and pipeline transportation services;
- Agriculture, forestry and fishing products and services;
- Fabricated metal products, except machinery and equipment;
- Air and space transport services.

A decrease in the exports of each of type of goods under study causes a decrease in the outputs of a number of other products. These products and services have been identified by the calculations made. Thus, when exports of mining and quarrying products decrease, the output of coke and refined petroleum products, machinery and equipment not included in other groupings; land transport and transport via pipelines services, warehousing and support activities for transportation services fall in the first place. A decline in the exports of transport facilities and equipment entails a decrease primarily in the outputs of base metals, fabricated metal products (except for machinery and equipment), computer, electronic, optical, and electrical equipment, as well as machinery and equipment not included in other groupings.

A reduction in exports of various products and services affects the size of output of some of the same products. Examples are given in *Table 3*.

[5] Relative values are sufficient to illustrate the correlation of forces of inter-branch chains of influence and to show decision-makers in the Russian Federation what they should pay attention to when working out development options in conditions of external attempts to isolate the Russian Federation from the world markets of goods, services, and finance. The author deliberately does not provide absolute figures here, so as not to enable the analysts, hostile to Russia, to assess the damage of the anti-Russian sanctions.

Table 1

The share of product exports in the volume of its use and in total exports from Russia in 2019, %

Product	In the volume of product usage	In the total volume of Russian exports
Mining and quarrying products	49.9	31.7
Chemicals and chemical products	46.5	5.5
Coke and refined petroleum products	37.3	13.8
Basic metals	36.3	9.9
Air and space transport services	34.5	2.0
Means of transport and equipment, and other vehicles	30.7	2.7
Finished metal products, except machinery and equipment	20.6	2.0

Source: compiled by the author according to Rosstat's data. URL: https://rosstat.gov.ru/storage/mediabank/tri-2019.xlsx

Table 2

Estimated rates of reduction in the volume of exports of the Russian Federation caused by a decrease in goods exports and services in question by the same specified amount, % (the maximum decline = 100%)

Product	Export	The volume of product usage
Mining and quarrying products	100.0	100.0
Coke and refined petroleum products	92.6	98.9
Basic metals	64.3	68.2
Chemicals and chemical products	45.3	47.6
Means of transport and equipment, and other vehicles	28.0	30.6
Fabricated metal products, except machinery and equipment	19.6	20.6
Air and space transport services	19.1	19.5

Source: compiled by the author according to Rosstat's data. URL: https://rosstat.gov.ru/storage/mediabank/tri-2019.xlsx

DECLINING IMPORTS AND FALLING OUTPUT

The bans, restrictions and sanctions imposed by unfriendly countries on the Russian Federation apply to a large group of goods and services imported by Russia. Our research has shown that, all other things being equal, if imports of products and services decrease by a given number of times, sectors with the highest share of imports in the total volume of goods in use suffer more. There is a mathematical proof of this argument:

Let us denote the total output of industry g at a time t by $Xg(t)$. Let us express it as the sum of imported goods $Ig(t)$ and everything else $Yg(t)$:

Table 3

Products and services in the top five goods in terms of the rate of decline in output caused by a decrease in exports of certain products

Exportable products and services	Products and services produced
Mining and quarrying products, coke and refined petroleum products	Land transport and transport via pipelines services; water transport services, rental, and leasing services
Chemicals and chemical products, basic metals	Mining and quarrying products; land transport and transport via pipelines services; electricity, gas, steam, and air-conditioning
Agricultural and hunting products and services, foodstuffs, beverages, tobacco products	Fishing and aquaculture products; paper and paper products; chemicals and chemical products
Chemicals and chemical products, air, and space transport services	Coke and petroleum products; warehousing and auxiliary transport services; mining and quarrying products

Source: compiled by the author.

$$Xg(t) = Yg(t) + Ig(t). \quad (1)$$

Here $Yg(t)$ — is the volume of intermediate consumption (without imported products) plus gross value added.

Let's assume that at the next point in time $t + 1$ the volumes of imported products of each industry g ($g = 1, 2, \ldots, n$) have changed by a factor of k. Then the output growth index at a time $t + 1$ will be as follows:

$$Vg(t + 1) = Xg(t + 1)/Xg(t) = \\ = Yg(t)/Xg(t) + k * Ig(t)/Xg(t). \quad (2)$$

In this expression, $Ig(t)/Xg(t)$ — is the share of imports and $Yg(t)/Xg(t)$ — is the share of the remaining output in total output. Let us denote them by $dIg(t) \in [0, 1]$ and $dYg(t) \in [0, 1]$ respectively. Since the sum of these fractions is 1, it follows from $dIg(t) + dYg(t) = 1$ that: $dYg(t) = 1 - dIg(t)$.

Inserting this representation $dYg(t)$ into expression (2), we obtain:

$$Vg(t + 1) = 1 - dIg(t) + k * dIg(t) = \\ = 1 - dIg(t) * (1 - k). \quad (3)$$

Correspondingly, for the sector j, we have:

$$Vj(t + 1) = 1 - dIj(t) + k * dIj(t) = \\ = 1 - dIj(t)*(1 - k). \quad (4)$$

It follows that

$$Vg(t + 1) - Vj(t + 1) = \\ = [dIj(t) - dIg(t)] * (1 - k). \quad (5)$$

In case when imports of goods decrease (i.e., $k < 1$), it follows from the equation (5) that the output change index g will be smaller than the output change index j (i.e., $Vg(t + 1) < Vj(t + 1)$ и $Vg(t + 1) - Vj(t + 1) < 0$) if and only if $dIg(t) > dIj(t)$.

In other words: for a given rate of import reduction, the reduction in output will be greater in the industry with the larger share of imports in total output.

The first seven industries with the largest share of imports in total output use, according to data provided by Rosstat in the "Table of domestic product use in basic prices for 2019", are shown in *Table 4*.

Given the existing inter-industry linkages and process chains in the production and usage of products, a reduction in output in one industry entails a reduction in production in a number of other industries.

Table 4

Industries with the share of imports in the total volume of product use of over 10% and not more 1%

The industry	Share of imports in total product usage, %
Share of imports more than 10%	
Production of motor vehicles, trailers, and semi-trailers	21.6
Manufacture of rubber and plastic products	16.2
Manufacture of basic pharmaceutical products and pharmaceutical preparations	16.2
Production of computers, electronic and optical products	15.6
Manufacture of beverages, tobacco products	13.8
Air and space transport activities	13.7
Manufacture of electrical equipment	11.8
Water transport activities	10.5
The share of imports is no greater than 1%	
Coke and refined petroleum products production	1.0
Electricity, gas, and steam supply; air conditioning	1.0
Real estate activities	0.9
Activities of households as employers; undifferentiated activities of private households to produce goods and services for own consumption	0.0

Source: compiled by the author according to Rosstat's data. URL: https://rosstat.gov.ru/storage/mediabank/tri-2019.xlsx

Let us consider such chains of inter-industry linkages.

FORWARD AND BACKWARD LINKAGES IN THE PRODUCTION OF GOODS AND SERVICES

Achieving the desired degree of economic independence of the Russian Federation has become particularly urgent in 2022. This required the creation and development of a number of critically important industries, changes in the sectoral and territorial structure of output, the use of new methods of economic and social management, improvement of the business climate and improvement of legislation.

As it was noticed above, by virtue of objective existence of technological, economic, transport connections in the production, storage and delivery of products created in a human society, the appearance of a new product or increase of the production volume of the already existing goods require changes in the production of other goods, even the ones that are not used directly at its creation.

For example, the production of microprocessors requires sand, neon, palladium, clean air control systems, electrochemical deposition systems, washing chambers, laboratory oxidation chambers, power supply systems, photolithography and other technological equipment, special

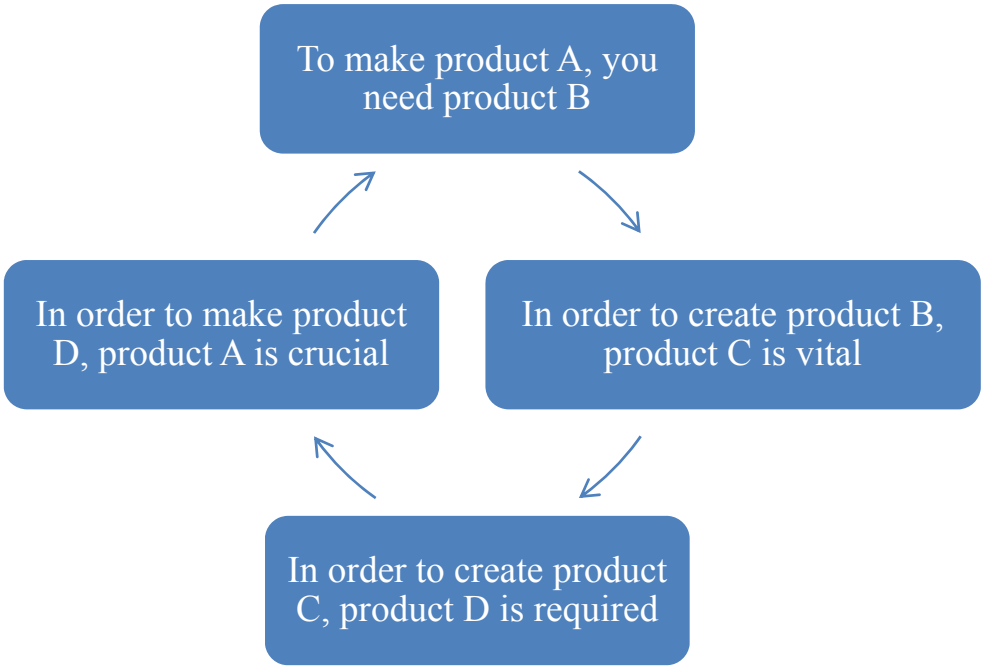

Fig. **An example of the technological link in the goods production**

Source: compiled by the author.

protective suits for workers, etc. Also, it is necessary to build factories for production of microprocessors, to form the developed system of location and delivery of all necessary things to producers and designed products to consumers.

As a result, manufacturing of microchips in Russia, apart from technology, specialists, investments, multifaceted support from the state, will require development of science, engineering, mining, chemical and light industries, ferrous and nonferrous metallurgy, machine building, construction, transport, warehousing, etc. Moreover, changes in the structure and volume of each ingredient required for microprocessors will entail a long chain of changes in the structure and volume of other products. For example, palladium requires nickel, silver, and copper sulphide ores. And for the production of processing equipment, we need ferrous and non-ferrous metals and composite materials, machines and equipment, logistic links and even microprocessors. It is like a closed-loop spiral (infinity or lemniscate), where in order to increase the production of a commodity, one must also increase, among other things, the output of the commodity itself (see *figure* below).

Input-output models allow to study such interlinks, chains and connections and help to calculate volumes of different items outputs [7–9].

OPPORTUNITIES FOR GROWTH

Below are some results of calculations of growth in output of goods, caused by the increase in the size of production of 16 types of products and services recorded by Rosstat, presented in the "Table of utilisation of domestic products in basic prices for 2019". These products (*Table 5*) will be referred to as "initial" or "estimated products". The choice of these products and services is due to two circumstances — all of them: a) are important for socio-economic development of the Russian

Table 5

16 initial goods and services

Product	Share in total output, 2019, %
Agricultural and hunting products and services	2.6
Mining and quarrying products	7.8
Foodstuffs, beverages, tobacco products	3.9
Coke and refined petroleum products	4.5
Chemicals and chemical products	1.5
Basic pharmaceutical products and pharmaceutical preparations	0.3
Rubber and plastic products	0.5
Basic metals	3.3
Computer, electronic and optical products	0.7
Motor vehicles, trailers and semi-trailers	1.2
Repair and installation of machinery and equipment	0.6
Building and construction services	5.5
Air and space travel services	0.7
Information technology products and services, software development services; consulting and similar IT services	1.0
Public administration and military security services; compulsory social security services	4.5
Human health activities	2.0

Source: compiled by the author according to Rosstat's data. URL: https://rosstat.gov.ru/statistics/accounts

Federation in the current environment; b) are affected by anti-Russian sanctions, bans and restrictions on imports and exports.

Calculations have shown that increases in the production of each initial product occur simultaneously with the expansion in output of a number of other products and services. Thus, growth in agriculture and hunting products and services is associated with an increase in the production of chemicals and chemical products, paper and paper products, with the development of fishing and aquaculture, with the expansion of land and pipeline transportation services, and scientific, technical, and veterinary services, and entails increases in foodstuffs, beverages, and tobacco output. Increases in the volume of software products and software development services, consulting and similar information technology services are accompanied by increases in computer repair services, personal and household goods, telecommunication services, postal and courier services, employment and recruitment services, and real estate-related services.

An increase in one part of these products and services is necessary to ensure growth in the initial product, while the other is a consequence of increase in its output. There are goods and services that grow with the growth of many of the initial products (see *table 6*).

Based on the results of the calculations, the initial products are divided into two groups.

Table 6

The first five products most frequently encountered in calculations, the production expansion of which occurs with the growth of the initial 16 types of goods and services

Product	Share in total output, 2019, %
Mining and quarrying products	7.8
Coke and refined petroleum products	4.5
Chemicals and chemical products	1.5
Manufactured metal products, except machinery and equipment	1.2
Land and pipeline transport services	3.6

Source: compiled by the author according to Rosstat's data. URL: https://rosstat.gov.ru/statistics/accounts

The first includes those activities whose output increase by *r %* requires a smaller, than *r,* increase in the output of all other activities. According to the calculations, this group includes, for example, extraction of natural resources; crop production, animal husbandry, hunting and provision of services in these fields; production of computers, electronic and optical products; development of computer software and consulting services; production of motor vehicles, trailers and semi-trailers.

The second group includes activities whose output growth by *r* percent requires the growth of a number of other activities by more than *r* percent. Thus, according to calculations, in order to increase the production of food, beverages, tobacco products by *r* percent, it is necessary to expand the output of products and services of agriculture and hunting, as well as fish and other products of fishing and fish farming, services related to fishing and fish farming by more than *r* percent. In the case of construction, there were 18 such activities. And for the growth of services in the field of public administration and military security, compulsory social security services by *r* percent, it is necessary to increase the output of 27 types of economic activities by more than *r* percent. The *Table 7* contains examples of products and services from the second group.

The third result from the calculations shows that the existing inter-sectoral linkages in the supply of products limit a possible scope of some products output expantion. Thus, the data from the "Table of Domestic Product Use at Basic Prices for 2019" by the Federal State Statistics Service of the Russian Federation (Rosstat) has allowed in calculations for an increase in the production of pharmaceuticals and materials used for medical purposes by no more than 2.5%; repair and installation services for machinery and equipment — by 3.0%, computer, electronic and optical equipment — by 3.5%, and the output of software products and software development services; consulting and similar services in information technology; information technology services — by slightly more than 4%.

At the same time the Rosstat data used in the calculations can raise by 8–10% (the upper limit of growth rates of output of products and services was set at 10%). The output of such products as "coke and refined petroleum products", "foodstuffs, beverages and tobacco

Table 7

The increase in the volume of some goods and services output which requires a faster growth in the production of other goods and services than they have

The initial product	Products and services that need to grow faster than the initial products
Human health services	Drugs and materials used for medical purposes
Rubber and plastic products	Chemicals and chemical products
Food products, beverages, and tobacco	Agriculture and hunting products and services Fish and other products of fishing and fish farming; services connected with fishing and fish farming
Repair and installation of machinery and equipment	Machinery and equipment not included in other classifications Means of transport and equipment, and other vehicles
Buildings and construction work	Other non-metallic mineral products Wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials Fabricated metal products, except machinery and equipment 15 other products and services
Public administration and military security services; compulsory social security services	Postal and courier services Buildings and construction services Telecommunications services Basic pharmaceutical products and pharmaceutical preparations Human health services 22 other products and services

Source: compiled by the author.

products", "agriculture and hunting products and services", "motor vehicles, trailers and semi-trailers".

MAIN RESULTS OF THE RESEARCH

In May 2022, Heli Simola, a senior economist at the Bank of Finland's Institute for Economies in Transition (BOFIT), which specialises in analysing the Russian economy, published calculations based on the Asian Development Bank's (ADB) 2019 inter-regional input-output table. They showed that the developed countries' "a ban on imports from Russia hits hardest the commodity branches such as mining, oil refining and wood-processing the hardest" [5, p. 7]. These are followed by metallurgy and water transport.

Our results revealed not only the most sensitive commodity groups to the reduction in exports, but also the products and services related to them by technological chains, as well as the products and services whose production reacts markedly to the decline in exports of many types of goods. Knowledge of such dependencies and the strength of influence makes it possible to calculate the effects of various types of restrictions and bans on exports and imports of products and services. Usually such bans, restrictions and sanctions constrain the economic development of a country, which requires the creation and expansion of domestic production, and a change in the structure and geography of external economic relations.

Because of the technological, logistical and economic (business) chains of interdependence in the production, transport and consumption of the products created by society, changes in each element of those chains affect a number of other elements as

Table 8

Average annual growth rates of some types of goods in 2023–2025, % (baseline forecast)

Manufacturing	2022 Assessment	2023–2025 Forecast
Computers, electronics, and optical products	103.4	101.8
Electrical equipment	94.4	101.3
Machinery and equipment, not included in other groupings	102.9	102.8
Motor vehicles, trailers, and semi-trailers	58.0	106.4
Other vehicles and equipment	100.7	103.0

Source: compiled by the author according to the Forecast of the socio-economic development of the Russian Federation for 2023 and for the planned period of 2024 and 2025.

well. This is a meaningful explanation of the following result: the increase of production of one of the products represented in the input-output balance sheet occurs simultaneously with the increase of output of some other products and services.

The technologies for producing a given quantity of a product determine the ingredients, quantities and ratios needed to create that product. As a product is scaled up and its characteristics change, some products may require more inputs than others. As a result, output of some ingredients may need to be increased by more, while others may need to be increased by less.

Accordingly, the two types of products and services have been identified by the calculations. An increase in the growth rate of the first type of products and services entails a smaller increase in the growth rate of all other products and services. If the growth rate of the second type of product and service increases, there are products that should be scaled up at a faster rate.

The indicators of the input-output balance record the actual input and output volumes that exist in the country. They, in their turn, were formed under the influence of objective economic laws, technologies used, and the established socio-economic system. The indicators of an input-output balance include neither the transition to mass application of principally and radically new technologies of production, delivery to the consumer and use of products and services, nor fundamental changes in the structure and volume of exports and imports, nor change of socio-economic formation. Therefore, the data recorded in the "Table of Domestic Product Use in Basic Prices for 2019", compiled by Rosstat, allow only for evolutionary changes in the size of output of products and services. For some products it is 1–2%, for others 3–5%, and for others it is slightly more.

It is therefore not by chance that in the Forecast of Social and Economic Development of the Russian Federation for 2023 and for the planning period 2024 and 2025 [10] the growth rates even for critical products are within the limits that coincide with our calculations (*Table 8*).

It is important that the calculations based on input-output balances help to identify the set of activities most conducive to the country's economic development and to overcoming sanctions pressures.

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Assessing the Readiness of Russian Industrial Enterprises for Digital Integration in the New Economic Conditions

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ABSTRACT

Integration processes ensure the progressive growth of the national economy, especially reckoning the factors of the crisis and the imbalance of the socio-economic environment in different forms of manifestation, including those caused by sanctions restrictions. The actualization of the problem of assessing digital integration at the level of the sectoral economy is due to the lack of comprehensive analytical methods that allow to identify the prerequisites and prospects for the digital integration of Russian industrial enterprises, considering various factors of the internal and external environment. The study's aim is to generalize related approaches and tools for analyzing the digital transformation of industrial enterprises and to develop a methodological approach to assessing the readiness of Russian industrial enterprises for digital integration. The study is based on an interdisciplinary approach, since digital integration relations cover a wide range of tasks, the solution of which involves the use of systemic, factorial, statistical, evidence-based, comparative and expert methods, as well as grouping and clustering. These methods make it possible to identify specific features of the assessment of digital integration in the industry. The information base for the assessment is the officially submitted data from the Russian system of statistical observation, as well as samples of approved target indicators of Russian strategic planning documents in digitalization and ensuring the sustainability of industrial enterprises. Based on the generalization of foreign and domestic experience, the authors have identified the parameters that were a subject to evaluation in terms of digital integration of industry complexes, groups of enterprises and legal entities. Systematization of scientific approaches to the research of digital aspects of industrial facilities proposed by domestic and foreign scientists. This allowed the authors to determine the basic conditions and factors that were the main ones for assessing the readiness of Russian industrial enterprises to the digital integration. In addition, the authors proposed evaluation indicators with the possibility of visualizing the results obtained for making further management decisions. The assessment results can be incorporated into making strategic decisions aimed at involving IT business entities, development institutions and industrial enterprises in digital integration. Considering the results obtained from the position of the authors, it makes sense to strengthen the functional and regulatory impact on large regional manufacturing enterprises with a high potential for digital integration.

Keywords: digital integration; industries; Russian industry; assessment indicators; digital integration factors

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INTRODUCTION

The evidence-based approach is becoming very popular in various fields of scientific and applied knowledge but is especially important for making medium and long-term decisions. The digital integration of industrial enterprises has a strategic vector; therefore it requires reasonable and balanced decisions based on qualitative and quantitative information [1, 2].

In the field of digitalization, as a rule, structures and processes are evaluated; Data management; quality of goods, works, services; innovative activity; external environment and its impact on the internal environment; financing; infrastructure and data security; ethical attitude to digital technologies [3–5]. The assessment involves the use of such parameters as: 1) digital coverage of different user groups, including individuals and legal entities, with an increase in the level of digital culture; 2) involvement in the creation of new digital business models and cross-logistics chains for the movement of goods; 3) the scale of introduction in the industrial sector and NPOs of advanced digital technologies (including end-to-end and additive), the industrial Internet of

things, artificial intelligence and distributed registry systems; 4) ways and barriers to use advanced IT technologies at industrial facilities; 5) distribution of digital platforms, new online services in the interaction and integration of business entities; 6) development of digital channels of corporate mobility; 7) development of the data industry, their processing, accumulation and distribution for business purposes, including digital analytical consulting; 8) development of new products based on client-centric and flexible approaches using design thinking and agile [6]. In fact, we are talking about creating open industries by analogy with open (cloud) organizations [8–10].

Organizations will be ready to transform into a digital enterprise only when they have: 1) operational resilience (a stable operating base); 2) organizational flexibility (quickly adapt to changes); 3) strategic flexibility (will be able to anticipate changes); 4) "disruptive" culture (receptive to the introduction of digital changes).[1] Accordingly, in order to successfully transform into a digital enterprise, an organization must demonstrate its readiness in the above four dimensions.

INSTITUTIONALIZATION OF THE FORMATION OF THE DIGITAL SPACE OF INDUSTRY

The specifics of the implementation of the digital transformation program in the industry is considered to be the broad support from the federal and regional budgets. Such a mechanism contributes to the faster introduction of advanced IT technologies into production and creates conditions for the formation of a digital industry space [10]. The basic projects of the ecosystem (digital space) are aimed at digital provision, first of all, of the high-tech manufacturing industry with an increase in the share of "smart" industries, as well as at maintaining national technological sovereignty in general. Through the introduction of "smart production" technologies based on Russian software, a significant increase in labor productivity and the expansion of technological, production and marketing capabilities of industrial enterprises are planned, which is extremely important for effective integration.

The creation of a new employment model through the digital transformation of production was considered as part of the implementation of the national project "Improving labor productivity and supporting employment", which started in Russia in 2018. Since 2021, the tasks of the national project have been expanded, and it has become focused on implementation at industrial enterprises of online-services of the digital ecosystem with an increase in the share of digital tools. Organizations participating in the national project to increase labor productivity through the digital ecosystem can be included in the national project at any stage of the life cycle, including at the stages of optimizing current activities and business processes. Adaptation of services to the existing production system and individual configuration of tools to support the improvement of production processes are provided, including through the national project. The goal of the digital ecosystem of the national project to increase labor productivity until 2025 is to join the national project for more than five thousand organizations, both SMEs and large ones. It is expected that participating companies will be able to implement new and better digital solutions, as well as provide significant productivity gains. At the current stage, many domestic companies (with the exception of large and technological ones) have not yet implemented ubiquitous digitized production processes, which does not allow them to fully ensure intensive growth rates of labor productivity.

A separate area in the designated national project is the development of the principles and competencies of lean production, the formation of the ethics of thrift at enterprises

[1] Assessing Readiness to be a Digital Enterprise — Part One. URL: https://www.institutefordigitaltransformation.org/assessing-readiness-to-be-a-digital-enterprise-part-one/

participating in the national project. Companies that are leaders in industrial digitalization increase labor productivity by about three times. As artificial intelligence technologies are introduced, the effect of the digitalization of industries will grow. The potential opportunities of digitalization make it possible to reduce the costs of information-intensive processes by 80–90%, and to reduce the execution time by several times. In addition, it contributes to ensuring the transparency of the activities of enterprises and organizations.

Digitalization has a significant impact on the entire operating environment and the internal functioning of companies, provides additional business opportunities in existing and new areas, including integration with other market entities. More and more companies are looking to benefit from digitalization, but at the same time, there are many challenges in digital transformation and digital integration. Automation systems throughout the life cycle require updating and improvement, including the introduction of digital technologies, which implies additional resource costs for the creation of digital ecosystems.

The digital space of industry is understood from the position of open ecosystems of an innovative type. For domestic companies, this is an opportunity to integrate into the digital market, to intensify the development of Russian software products, applications, services, and advanced digital tools (for example, artificial intelligence systems),[2] that they can offer to industrial companies and other interested parties [11].

METHODOLOGICAL BASIS AND THE PARAMETERS FOR ASSESSING THE DIGITAL INTEGRATION OF INDUSTRIAL ENTERPRISES

Systematizing some foreign and domestic studies [12–18], developing the conceptual approach of a single digital space and adapting it to the industrial sector of Russia, we note that when developing a methodological basis for assessing the readiness of Russian industrial enterprises for digital integration, it is necessary to take into account the following features:

1) the degree of industrial connectivity of industrial enterprises (industrial center, cluster, core, role in the chain of the reproduction process);

2) territorial affiliation of industrial enterprises;

3) the level of integration of ICT (Information and Communication Technologies) into business processes and the digitalization of the production of industrial enterprises (new business models in industry, the creation of digital business models);

4) the role of industrial enterprises in creating added value or in increasing the return on innovation (the result of intellectual activity with the potential for commercialization, the creation of intellectual property objects and the possibility of registering rights, the introduction of Industry 4.0 technologies and artificial intelligence systems in industrial enterprises);

5) the availability of working capital for the implementation of digital innovation projects of industrial enterprises and the development of the institutional environment of the digital economy [financial institutions, development institutions, business environment, participation in national projects (including "Increasing labor productivity")];

6) risk-based tools for digital integration of industrial enterprises, including data protection and cybersecurity.

Based on the identified features, we single out *the six main factors* with the greatest impact on the digital integration of Russian industrial enterprises:

1. Cooperation links and clustering.
2. Spatial localization.
3. Industry digital readiness and lean manufacturing.

[2] The "4.0 RU" program has been launched in Russia. URL: https://plastinfo.ru/information/news/34067_14.07.2017/

4. The knowledge economy in the industry.

5. Sources of financing for the digital integration of industrial enterprises.

6. Risk management of digital integration.

Each factor is evaluated by a set of indicators formed on the basis of official statistics and proposed calculation data. The result is an aggregated valuation model that takes into account all six factors.

To form a set of indicators, official information materials were used, including presidential decrees on the national development goals of Russia in the period 2017–2030; national projects; state and departmental programs of the Russian Federation in the field of scientific and technological development for a long-term period, in the field of economic innovative development and increasing the competitiveness of Russian industry; on the issues of ensuring economic and environmental security, as well as the digital transformation of industries and the national economy. Special attention is paid to the analysis of passports of national projects of labor productivity and employment support, SMEs and initiatives in entrepreneurship, analysis of strategic infrastructure projects of federal significance. The study summarized the operational information of ministries and departments on the current social and economic situation, in particular, the Ministry of Economic Development of Russia, the Ministry of Industry and Trade of Russia; forecast data and scenario parameters of socio-economic development for the period 2022–2025, including taking into account anti-crisis and anti-sanction measures. In addition, official statistical indicators were used, in particular, operational information on the development of national SDG indicators[3] and the technological development of the Russian economy, statistical information related to science, innovation and technology,[4] as well as monitoring of the development of the information society.[5] Other sources and reviews are also summarized [19].

The following set of indicators is proposed to assess the pronouncement of each of the six factors above in the industry.

I. *Cooperation links and clustering.*

1.1. The share of industrial organizations (of the total number) using cloud services and broadband Internet access systems, in %.

1.2. Number of organizations, ICT sector, in units.

1.3. Personal (individual) production of industrial organizations that are members of innovative territorial clusters (dynamics compared to the base and the previous year).

1.4. Investment expenditures of organizations in the fixed capital of ICT, including equipment, intellectual property objects, buildings (structures), including, based on their investment structure, in %.

1.5. Business activity of ICT organizations, in %.

1.6. Business activity of industrial enterprises, in %.

1.7. Share of e-procurement of the industry sector, in %.

1.8. Number of industrial clusters, in units.

1.9. Number of electronic platforms (marketplaces), in units.

1.10. The number of industrial enterprises included in the Russian rating of high-tech companies (TechUspekh/(TechSuccess), in units.

II. *Spatial localization.*

2.1. Centers of economic growth, in particular the industrial (cluster) core of a subject of the Russian Federation, a macro-region or an agglomeration, which are provided with high-speed transport communications, in %.

[3] Status of development of SDG indicators. URL: https://rosstat.gov.ru/sdg/reporting-status

[4] FSGS. Federal State Statistics Service. Science, innovation, technology. URL: https://rosstat.gov.ru/statistics/science

[5] Monitoring the development of the information society. URL: https://rosstat.gov.ru/statistics/infocommunity

2.2. Transport provision of the constituent entities of the Russian Federation, compared with the base and previous years.

2.3. Number of industrial (sectoral) technology parks, in units.

2.4. The number of socio-economically significant enterprises in the industrial sector, in units.

2.5. Number of high-tech enterprises, in units.

2.6. Number of electronics industry enterprises, in units.

2.7. The share of electronic industry enterprises in high-tech enterprises, in %.

2.8. Number of innovative development institutions (venture companies, development corporations, funds), in units.

2.9. Number of digital industry fairs and exhibitions held, in units per year.

2.10. Number of territorial innovation clusters, in units.

III. *Industry digital readiness and lean manufacturing.*

3.1. Gross value added of ICT economic entities, in % of GDP;% to GRP (for subjects of the Russian Federation).

3.2. The share of goods (R / C) with an innovative component of industrial enterprises from shipped, in %.

3.3. Introduction of modern digital and automated industrial production technologies, in units (quantity).

3.4. The share of engineers in the industrial sector who intensively use digital technologies, in % of the total number of engineers.

3.5. The share of specialists in the industrial sector by databases and networks, in % of the total number of engineers.

3.6. Organizations implementing innovations in technologies and technological processes, in % of all organizations and in % of industrial organizations.

3.7. Dynamics of labor productivity growth for enterprises participating in regional projects and programs, including through regional centers of competence (RCC).

3.8. The share of high-performance jobs in production areas, in %.

3.9. The share of enterprises implementing State ISO standards in the industrial sector, in %.

3.10. Return on assets of industrial enterprises, based on net profit.

IV. *The knowledge economy in the industry.*

4.1. The volume of internal costs for R&D in the field of digitalization, in % of the total costs for R&D.

4.2. The volume of domestic costs for digitalization, digital integration and digital services, in % of GRP — by constituent entities of the Russian Federation, in % of GDP.

4.3. Share of applications for patents of digital technologies (total) and digital technologies in industry (Industry 4.0., industrial property applications), in % of all applications filed with Rospatent.

4.4. Share of patents on ICT objects registered with the national patent office, in % of the total number of registered patents.

4.5. Dynamics of internal costs of industrial enterprises for digitalization, including the creation and implementation of ICT technologies, in % of total costs, growth rate in relation to the previous and base years.

4.6. Development of production software by domestic ICT companies, in units (quantity).

4.7. The share of products (works/services) with an innovative (technological) component, in % of all shipped products provided by R/S.

4.8. Educating specialists, bachelors and masters in professions and qualifications in the field of ICT and digital production, in % of all vocational and higher education graduates in the system, including the regional component.

4.9. The share of industrial enterprises included in the rating of the most innovative companies (according to RAEX), in %.

4.10. The level of innovative activity of industrial enterprises, dynamics compared to the base and previous year.

V. *Sources of financing for the digital integration of industrial enterprises.*

5.1. Growth of investments (investment activity) in the fixed capital of industrial enterprises through the use of digital technologies, in % of the base and previous year.

5.2. Growth of investments and budget financing of companies — domestic software developers, in % of the base and previous year.

5.3. The share of internal gross costs of industrial organizations for the development of the digital economy by type, in %.

5.4. Internal costs of enterprises and industrial organizations for the digitalization of business processes, including the acquisition and integration (adaptation, refinement) of digital technologies; provision of telecommunications, digital content, software purchase, staff development in digital competencies and ICT implementation, in % of total costs.

5.5. The share of external costs in the use and implementation of digital technologies, in % of total costs.

5.6. Structure of investments (according to sources of financing) of the ICT sector: own funds; attracted funds, in billion rubles.

5.7. The share of internal financing of technological innovations of organizations in the industrial sector, in % of total costs.

5.8. Net profit of industrial enterprises, in billion rubles.

5.9. The share of costs for the development of general digital competencies of personnel, in % of total costs.

5.10. Share of costs for the development of special digital competencies (Industry 4.0), in % of total costs.

VI. *Managing the risks of digital integration in the industry*

6.1. The number of critical information infrastructure objects, in units.

6.2. The number of errors and failures of technical support in the industrial sector, in units.

6.3. The share of errors and failures of the ICT infrastructure in all equipment failures, in %.

6.4. The number of virus infections and hacker attacks on web services, in units.

6.5. Number of digital logistics systems, in units.

6.6. Share of errors of non-professional use of ICT infrastructure in the industry, in % of total errors.

6.7. Share of biometric access to the IT system, in % of total access.

6.8. The share of artificial intelligence technologies in the industrial sector, in % of total technologies, in % of all digital technologies used.

6.9. The number of data centers for aggregation and processing of information, in units.

6.10. The share of organizations using special software, in %.

We also note that digital integration in industry covers three blocks at the level of industrial enterprises: organizational management, business goals, technology, which is reflected in our approach.

Due to the different dimensions of the generated indicators, it is proposed to use the scoring method at the second stage (for aggregation and generalization), and at the third stage, the construction of a "radar" diagram. The maximum value is 180 points (6 groups of 10 indicators, each of which is ranked according to the values "high-medium-low-absent" with assignment of 3, 2, 1 and 0 points, respectively).

PARTICIPATION OF THE EXPERT COMMUNITY IN THE ASSESSMENT OF DIGITAL INTEGRATION IN THE INDUSTRY

Experts are qualified specialists in a specific professional field, have pronounced cognitive competencies that allow them to formulate sound conclusions on any issues.

In order to improve the efficiency of assessing the readiness of Russian industrial enterprises for digital integration, a set of requirements for experts is proposed. Taking into account the importance of the assessment tasks, as well as the subsequent interpretation of the results for decision-making, we believe it is appropriate to include

CDTO (Chief Digital Transformation Officer) positions in the expert group of specialists (managers). With a comprehensive set of competencies, digital transformation leaders are able to systematically see the potential and risks of digital integration.[6] The role of digital transformation leaders has increased significantly in the past five years, and companies are actively introducing new structural divisions with the appointment of CDTO. The position of CDTO as creators of synergy is especially effective in the context of large and medium-sized industrial companies.

Functionally, digital transformation leaders are responsible for issues related to the development of a digital strategy and control of its implementation through general as well as special (budgeting, formation of digital environments, harmonization of corporate data automation processes, design of digital products and services) management techniques. In addition, an important task of the CDTO is to create a corporate center of competence, since there is often resistance from employees of enterprises to digital changes, covering almost all areas of corporate activity — from industrial processes to external communications. Moreover, it should be borne in mind that digital transformation applies to the entire management system.

In the case of active support at the senior management level of the head of digital transformation with the assignment of responsibility for mobilizing organizational resources (including networks and communications), CDTO can effectively implement fundamental transformational changes to introduce advanced digital technologies into the business processes of industrial enterprises. The requirements for CDTO include the following competencies and skills: customer centricity, communication, emotional intelligence, result orientation, creativity, criticality, management tools and organizational culture, knowledge of digital technologies, data analysis, IT infrastructure. CDTOs are usually experienced experts and professionals who understand the prospects and trends of ICT development, many of them have promoted and invested in technology projects (start-ups).

The intensity of the introduction of digital technologies determines the complexity of digital transformation processes, which is emphasized not only by practitioners, but also by the scientific community. In companies that widely use digital technologies, it is necessary to create an appropriate operating environment [20].

In our opinion, as an additional requirement for experts, knowledge in the field of industrial safety and digitalization of industry should be included. If we consider general analytical skills, then they include: logical and critical thinking, strategic vision, skills of static and comparative generalization, mathematical and simulation modeling, and the ability to analyze heterogeneous data. Based on a set of competencies, it is advisable to form an expert group (team) with an odd number of participants — a similar principle of creating teams is used in cases where decisions are made collectively.

CONCLUSIONS

Considering the above-mentioned information, we should note that the formation and development of the digital space of industry involves the active participation of all the interested parties — starting from the state and ending up with the direct participants in integration relations. Russian industrial enterprises are generally ready to switch to digital production if optimal institutional and technological conditions are created. At the same time, due to the heterogeneity of the economic and technological potential of industrial

[6] Requirements for the level of competence of the role of "CDTO — the head of digital transformation" in the public administration system. URL: https://hr.cdto.ranepa.ru/att-3

enterprises, the digital environment in them differs significantly. Effective digital integration is possible within open ecosystems that include industrial enterprises, ICT organizations, institutions for the development of the digital economy and digital markets.

Assessing the digital integration of industrial enterprises is an understudied area of research. The evaluation parameters may vary depending on the goal and focus on a comprehensive or local nature.

The proposed methodological approach makes it possible to conduct a comprehensive assessment of the readiness of Russian industrial enterprises for digital integration, to identify the potential opportunities for territories (subjects of the Russian Federation) to create ecosystems with the inclusion of the industrial sector in them, which will contribute to faster digital transformation and increase the added value and competitiveness of manufactured products of industrial enterprises.

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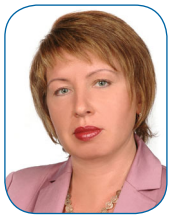

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Progress of State Financial Support Methods of Russian Exports in Modern Conditions

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ABSTRACT

The paper studies methods of support for Russian exports in modern conditions. The purpose of the research is to review the current system of financial support for Russian exports and determine ways for its further development. The study concluded that it is necessary to develop instruments of financial support for exports by introducing standardized financial products. The author highlights the importance of providing financial services to counterparties of Russian exporters from friendly countries as well as using the opportunities of the Russian financial market to support exports, including syndicated lending and the ruble bond market. This allows relating prospects for further research to the development of additional mechanisms for increasing Russian exports to friendly countries, as well as identifying ways to increase the export of services, including financial, information and telecommunications.

Keywords: Russian exports support; state export support institutions; international trade; non-commodity export; international payments; payment system in Russia; national currencies; Russian financial market; money-credit policy

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INTRODUCTION

By the end of 2021, the Russian exports totalled more than $ 540 billion, or 1.7% of global exports of goods and services. Non-resource non-energy exports are estimated at USD 191 billion.[1] The key destinations for non-resource non-energy commodity exports from Russia are Belarus, Kazakhstan, China, and Turkey.

Higher energy prices, combined with reduced imports due to restrictions imposed on Russia by G7 countries, have contributed to a sharp increase in the surplus of goods and services (*Fig. 1*).

The recovery of economic activity in the EAEU countries has also ensured an increase in Russian exports. The volume of Russian exports to the EAEU countries, at the end of 2021, increased by 34% as compared to the same period in 2020, reaching USD 45.8 billion.[2]

Positive trends also include an increase in services exports by more than 16% in 2021 compared to 2020, in particular, information and telecommunication services.

At the same time, the deteriorating environment for Russian exporting companies caused by the sanctions limitations creates risks of falling revenues from both resource and non-resource exports in the short term. The sanctions imposed on Russia create uncertainty about the dynamics of Russian export performance in the short term, as companies face the need to reorient themselves to new markets, realign their logistics, and find new suppliers of equipment

[1] The Russian Export Centre website. URL: https://www.exportcenter.ru/press_center/news/nesyrevoy-neenergeticheskiy-eksport-rossii-ustanovil-istoricheskiy-rekord-i-prevysil-191-mlrd

[2] Volumes, rates, and proportions of development of mutual trade of EAEU member states. Eurasian Economic Commission. URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/tradestat/tables/intra/Documents/2022/01/I202201_1.pdf

and materials needed to produce export-oriented products. In addition, resource-based commodities continue to account for a significant share of exports (*Fig. 2*).

Entering foreign markets will help companies to improve the quality of their products, their corporate governance, and their innovation activities [1]. Increased non-resource non-energy exports are an important driver of economic growth. The profits of exporting companies provide an increase in tax revenues to the budget system. In addition, the business development of exporting companies ensures the inflow of new knowledge and technologies into the country.

In these circumstances, the implementation of targeted financial support measures for exporters that help Russian companies enter new markets, build new supply chains and logistics, ensure the necessary imports of materials and equipment, as well as to make payments and settlements is of paramount importance.

The system of state financial support for Russian exports should take into account global economic trends at the current stage, create favourable conditions for increasing non-resource non-energy exports to friendly countries, and promote the innovative development of the Russian economy.

Issues related to the development and support of Russian exports remain relevant and are the subject of study by Russian scientists [2–7]. The problems of strengthening the export potential of individual countries and industries are considered by foreign authors [8–12]. Publications devoted to these issues contain different points of view regarding the use of state support instruments for Russian exports, while the problems of developing financial mechanisms for these purposes remain unresolved and require additional consideration. A significant change in the external environment also necessitates further research into these issues in the context of the structural transformation of the Russian economy.

ASSESSMENT OF THE CURRENT SUPPORT SYSTEM FOR RUSSIAN EXPORTS AND POSSIBLE WAYS TO DEVELOP IT

A key element of Russia's export support system is the national project "International Cooperation and Export", which provides for government policy aimed at improving the competitiveness of non-resource sectors of the Russian economy and creating favourable conditions for increasing non-resource non-energy exports. Increasing exports of high-tech products as well as expanding the range of goods supplied is one of the important prerequisites for successful economic development [13]. The implementation of the national project implies that non-resource non-energy exports should increase by at least 70% by 2030, compared to the corresponding figure for 2020. Particular attention is paid to the development of mechanical engineering, agriculture and services. Continued integration processes within the Eurasian Economic Union are seen as a necessary factor contributing to the export potential of Russian companies. In addition, the "Priority Action Plan to ensure the development of the Russian economy in the face of external sanctions"[3] is important for the Russian economy in the changed environment. It includes support for key sectors of the economy, development of transport infrastructure, reduction of administrative barriers for Russian companies, assistance to SME exporting companies, and reduction of duties and simplification of import procedures for products important for economic development.

[3] Measures to build economic resilience in the face of sanctions. Russian Government website. URL: http://government.ru/rugovclassifier/901/events/

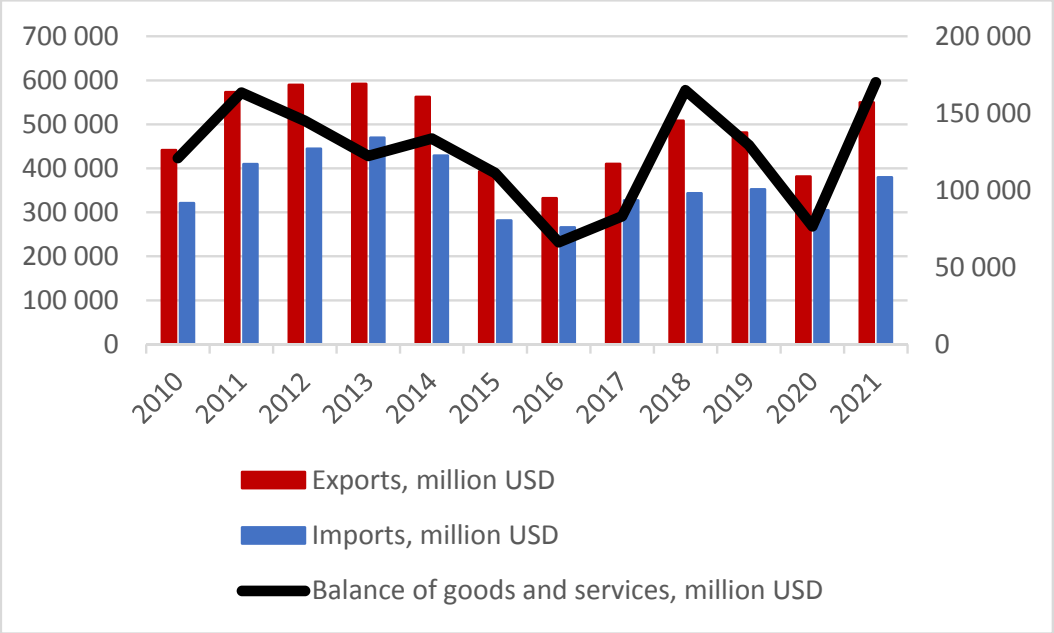

Fig. 1. **Indicators of the account of goods and services of the payments' balance in Russia (standard components), mln USD**

Source: compiled by the author based on the Bank of Russia data. URL: https://www.cbr.ru/vfs/statistics/credit_statistics/bop/bal_of_payments_standart.xlsx

The challenges of increasing non-resource non-energy exports in the context of the current sanctions and the risk of a growing crisis in the global financial system necessitate the flexible use of financial mechanisms to create favourable conditions for the development of Russian companies producing non-resource non-energy products. Improvement of financial mechanisms for supporting exports implies a comprehensive approach that combines strengthening state development institutions, deepening financial cooperation with friendly countries, developing public-private partnerships, building the necessary infrastructure, etc. Public investment in the development of transport routes that carry products to foreign markets is of significant importance to increasing Russian exports. In addition, an important condition for increasing the export potential of Russian companies is the creation of favourable macroeconomic conditions for their development.

VEB.RF is the most important element in the system of state support for Russian exports. The key institutions within the VEB.RF Group structure that ensure the functioning of the system of financial support for exports are JSC "Russian Export Centre", JSC "EXIAR" (Export Insurance Agency of Russia or Russian Agency for Export Credit and Investment Insurance) and JSC "Roseximbank". "Russian Export Centre" conducts the organisational work required to obtain access to the financial instruments of state support for exports. JSC "EXIAR" provides insurance services for exporters and banks lending to them. JSC "Roseximbank" and VEB.RF supply credit products to exporting companies and foreign buyers of Russian products. The inclusion of the Russian Export Centre into the VEB. RF Group, as well as the optimisation of interaction between development institutions and the Russian Government as part of work on the implementation of the national project "International Cooperation and

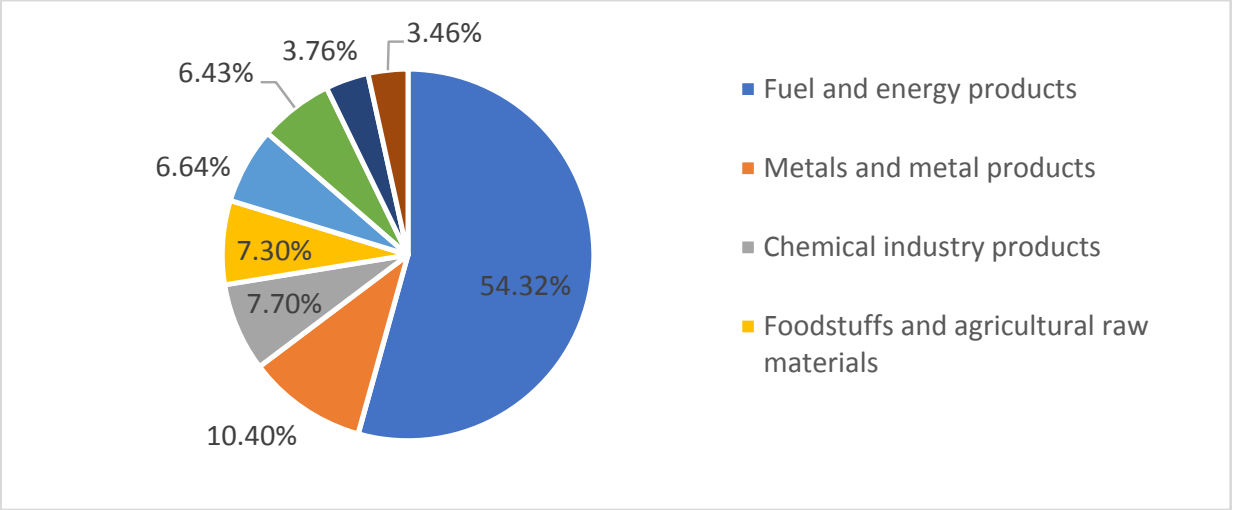

Fig. 2. **Commodity structure of Russian exports in January — December, 2021, %**

Source: compiled by the author based on the Federal Customs Service data. URL: https://customs.gov.ru/folder/519

Export" have made significant progress in the formation of the export financial support system and created conditions for its increase. Cooperation between public authorities and development institutions as part of export support activities is also important in terms of the quality of the policy pursued, the predictability of this system's development and the reduction of business risks [14, 15].

Within the framework of financial support to Russian exports, an important feature is the consolidation of specialised development institutions within the VEB.RF Group structure, which ensures that companies can receive it at all stages of project implementation related to production and exports. This consolidation is important both from the point of view of optimising the business processes of state organisations established to support exports and the convenience of exporting companies.

Export support institutions in most of the world's leading trading nations are accountable to the government. Their management by a state development corporation is not a typical practice. In the author's opinion, the integration of export support institutions into the VEB.RF structure makes it possible to react flexibly to the needs of market participants and to create financial products oriented to satisfy the needs of Russian exporters and the credit organisations serving them. In addition, such consolidation is important in terms of the availability of qualified personnel and expertise to ensure the quality of decisions made.

VEB.RF's key role in the system of state financial support for exports is determined both by the scale of lending and the projects implemented, and by the fact that the "Russian Export Centre" Group acts as an agent of the Russian Government. The activities of development institutions create additional competitive advantages for Russian companies on foreign markets through lending to exporting companies, providing financing for foreign buyers of Russian products, as well as implementing major projects aimed at developing infrastructure. Credit institutions that use financial products from development institutions can reduce credit risk and improve the Bank of Russia's obligatory ratios by using lower risk ratios. Financial products of development institutions help to reduce the cost of funding for Russian exporters — they are provided with loans and the banks

servicing them are provided with financial services.

The financial products created by the Russian Export Centre, including guarantees, crediting and insurance, allow the exporter to improve the quality of risk management (including political risks as well as — non-payment under export contracts) under export contracts. The financial instruments to support Russian exports offered by the VEB.RF Group are standard for global practice and enable exporters to obtain additional opportunities for business development [16].

The G7 countries, by imposing sanctions on Russia, have almost completely blocked access to their financial markets and have made settlement in the respective currencies very difficult for foreign economic activity. In these circumstances, state support measures implemented through state development institutions are of particular importance. The key direction is to expand the scale of financial support to Russian exporting companies by state development institutions taking into account the tasks set in the national project "International Cooperation and Export" and the "Priority Action Plan to Ensure Development of the Russian Economy under External Sanctions Pressure". In this context, support for small and medium-sized enterprises, stimulation of innovation activity, industrial development, as well as optimisation of financial products to meet exporters' needs are important. It is important to note that state support for small and medium-sized enterprises is more effective than assistance to large companies and contributes to the effectiveness of state programmes [17].

The development of a system of financial support for exports will be facilitated by the development of model financial products by state development institutions, combining traditional tools related to lending, insurance and provision of guarantees; financial support to exporters to overcome the consequences of sanctions imposed; other measures for which the "Russian Export Centre" Group acts as the Russian Government agent; additional financial services, including risk hedging, assisting companies in accessing the Russian capital market.

With the development of financial products to support exports towards addressing the different needs of exporters, demand will increase, which is an important factor in increasing the performance efficiency impact of the system and creates additional conditions to meet the challenge of increasing non-resource non-energy exports, including the entry into foreign markets of companies that have not previously done so.

The key condition for solving these tasks is the ability of the state financial support system for Russian exports to generate a multiplicative effect, which consists in attracting private lending institutions to work with Russian exporters, creating a favourable environment for investing in Russian companies' export projects, and effectively using the companies' own funds.

Enhancing the activity of development institutions involves increasing the volume of insurance support for Russian exports by JSC "EXIAR" (Export Insurance Agency of Russia), expanding the practice of lending by JSC "Roseximbank" and VEB.RF to Russian high-tech exporting companies, participating in the financing of projects to create new exports, and financing VEB.RF infrastructure projects required to promote Russian exports.

In the context of the structural transformation of the Russian economy, an important condition for increasing and supporting investment activity with regard to Russian exports is to strengthen the resource base of development institutions [18]. In the course of activities to support Russian exports, it may be necessary to increase the capital of development institutions belonging to the

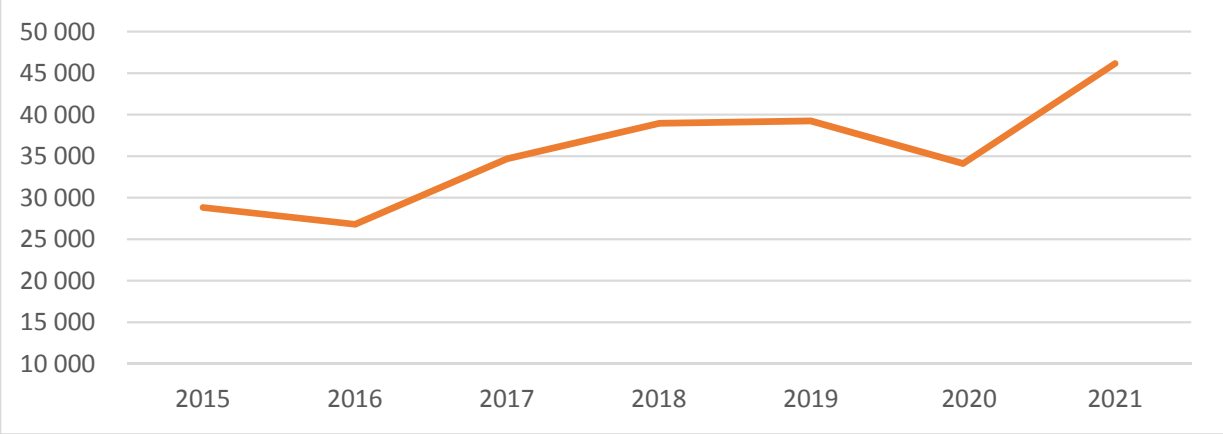

Fig. 3. **Russian export of goods to the EAEU countries, mln USD**

Source: compiled by the author based on data from the Eurasian Economic Commission. URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/tradestat/Pages/default.aspx

VEB.RF Group in order to maintain their stable financial position amid an increase in their loan portfolios and the sanctions imposed. This measure would provide them with the additional financial resources needed to invest and help increase non-resource non-energy exports.

The development of integration processes within the EAEU, as well as economic cooperation with the states that didn't impose sanctions on Russia, opens up additional opportunities to redirect and increase Russian exports. The use of financial support instruments will create conditions for further growth of Russian exports to countries within the EAEU (*Fig. 3*).

In this context, financial cooperation between development institutions and financial regulators acquires particular importance. For this cooperation will facilitate the creation of infrastructure for rouble settlements between economic entities, the formation of a common EAEU financial market, and the use of the potential of VEB.RF and the EDB (Eurasian Development Bank) to finance projects aimed at deepening economic integration and increasing the export potential of EAEU economies.

The Eurasian Development Bank's provision of loan products to Russian companies exporting to the EAEU countries is a promising element in its system of state financial support.

Strengthening financial cooperation between the Eurasian Economic Union and the Eurasian Development Bank will also promote investment and create additional opportunities to increase Russian exports to the Commonwealth. Common development institution projects are important for cooperation between EAEU companies and for exporting jointly produced goods to international markets.

Improving the system of financial support for exports is an important part of government policy to boost economic growth and involves taking into account current global development trends, the needs of exporters under current sanctions restrictions, and the achievements of the modern financial industry. In order to increase non-resource non-energy exports, further promotion of financial products is needed which should contribute to the formation of multiplier effects in the Russian economy by attracting private banks to lend to export projects and increasing the availability of their resources to Russian companies.

An important area is the development of integrated products that include the provision of financial services directly to Russian exporters and foreign buyers. In particular, expanding the practice of lending to buyers will stimulate demand for Russian products and help to create additional competitive advantages for Russian companies as they reorient to new markets.

The expansion of the rouble-denominated syndicated lending market and the participation of state development institutions as arrangers and lenders in transactions will provide Russian exporting companies with a convenient instrument for long-term project financing to increase export opportunities in the context of the de facto closure of the international debt market for Russian borrowers. In particular, improving the practice of pre-export financing in the form of syndicated loans will help to attract additional financial resources for large export projects.

Increasing the capacity of the rouble-denominated syndicated lending market will create opportunities for the development of the Russian financial market in general and for companies exporting products with a high share of added value. Expanding the practice of syndicated loans organised by development institutions and their participation in transactions as lenders will help to improve the quality of risk management in credit institutions, increase banks' asset liquidity, attract private banks to lend to export projects, as well as improve cooperation between banks and development institutions.

A promising area for the Russian export support system is the provision of financing by state development institutions for suppliers whose products are critical for Russian exporting companies, whose access to quality components is one of the essential conditions for their products to be competitive on foreign markets [19]. Expanding the practice of using financial products from development institutions, including credit and insurance, to provide the necessary imports in the production of goods by exporting companies would create additional competitive advantages for the Russian economy in the face of adverse external factors.

Purchasing factoring is one of the ways to improve the stability of component supply chains. This financial product allows component suppliers to optimise their liquidity management process. An exporter purchasing components can count on more favourable terms for their purchase as well as minimise the risk of delays in delivery of important components. The provision of purchase factoring services by state export support institutions is particularly important in the context of problems with component deliveries. In addition, the development of this tool will allow Russian exporting companies to improve the quality of product cost management and create additional opportunities to form long-term sustainable relationships with key suppliers.

At present, the insurance services provided by JSC "EXIAR" (Export Insurance Agency of Russia) are in line with the world practice of working with companies and banks. The services on insurance of accounts receivable, export contracts, credits as well as letter of credit are in demand in the Russian market. The importance of the tasks set out in the national project "International Cooperation and Export" dictates the need to increase insurance support for Russian business. The growth in demand for insurance products provided by state development institutions will contribute to the growth of Russian exports to friendly countries by making lending to exporters more attractive to Russian banks; an additional inflow of investment to export-oriented companies, and an increase in their production capabilities. Products for exporters belonging to small and medium-sized businesses will be a promising area of insurance development. Support for

this segment implies, first and foremost, the development of products with a high degree of standardisation and affordability. An additional area for improving the efficiency of insurance support for Russian exports is the provision by development institutions of unrelated insurance services that do not relate to a specific export contract.

Support for the Russian economy in the context of the implementation of sanctions risks involves the expansion of the practice of development institutions to provide insurance services for companies importing products that are essential for the smooth operation of businesses, both exporting and operating only for the domestic market. In particular, these instruments include insurance of advance payments made by Russian importers when fulfilling their contractual obligations, as well as bank loans extended to importers.

The virtual absence of debt financing opportunities on the international debt market underlines the importance of developing the Russian market and the need to use its instruments to raise financing for exporting companies.

The companies' entry into the bond market can have a positive impact on their business by raising borrowed funds for production development, increasing transparency, diversifying their funding sources, as well as building a public credit history.

The development of the Growth Sector of the Moscow Exchange could be seen as a positive trend, focusing in particular on helping to raise financing for the SME segment, exporters and companies supported by "Russian Export Centre" and SME Corporation. The SME segment companies can be partially reimbursed from the federal budget for coupon rates and costs associated with bond issuance.[4] However, this market segment is relatively small. In 2021, the total volume of placements by companies in the SME segment amounted to RUR 7.9 billion, and the total number of traded bond issues reached RUR 47 billion.[5] Greater involvement of export support institutions in this segment is important in terms of financing Russian companies and creating favourable conditions for export projects.

The organisation by development institutions of rouble-denominated bond issues for medium-sized exporting companies would help to increase financial support for non-resource non-energy exports. In addition, their provision of nominal and coupon guarantees for bond issues could also be considered as one area of support for medium-sized companies that do not have a public credit history. The provision of these financial products by state export support institutions involves a comprehensive assessment of the financial condition of potential borrowers and a risk analysis of the respective projects. These measures are important both for companies expanding their export capabilities and for those planning export projects.

OPPORTUNITIES TO USE THE BANK OF RUSSIA'S INSTRUMENTS TO SUPPORT RUSSIAN EXPORTS

Achieving the long-term objectives of the Bank of Russia's policy ensures the maintenance of financial stability, is an important condition for the development of the real sector of the Russian economy and for increasing the export potential of Russian companies, and also contributes to building economic actors' confidence in the financial system.

[4] Decree of the Government of the Russian Federation No. 532 of 30 April 2019 "On Approval of the Rules for Granting Subsidies from the Federal Budget to Russian Organisations — Small and Medium-Sized Enterprises to Compensate Part of the Cost of Issuing Shares and Bonds and Paying Coupon Income on Bonds Placed on the Stock Exchange" (as amended on 31 December 2021).

[5] Moscow Exchange. The Growth Sector is an exchange platform for small and medium-sized companies to attract investment. URL: https://fs.moex.com/files/17475

Strengthening confidence is important for increasing the investment planning horizons of companies implementing export projects, as well as for expanding the practice of using the rouble as the currency of settlement in foreign economic activities.

Monetary policy ensures a favourable environment for the production and export of non-resource non-energy products, the implementation of long-term projects and the stability of credit spreads in the Russian financial market, ensuring the availability of financial resources for Russian companies and their adaptation to the changed external environment.

Government fiscal policy measures during the coronavirus-induced crisis demonstrated their effectiveness and contributed to a reduction in the cost of credit, provided an increase in stock market quotations, and created the conditions for post-crisis recovery. Fiscal spending, combined with a reduction in the Bank of Russia's key rate, supported the real economy. However, the dramatic change in external factors due to sanctions imposed by G7 countries created significant risks for Russian companies and necessitated a monetary policy conducive to the successful development of the economy in the new environment.

Despite the reduction in the Bank of Russia's key rate from 20 to 8%[6] between April and August of 2022, the situation remains challenging for Russian companies. The deterioration of the Russian financial market environment has had a significant impact on exporters' operating conditions due to higher borrowing costs and tighter lending conditions. In addition, the introduction of capital flow restrictions and the obligation to sell part of foreign currency earnings have also had an impact on the activities of Russian exporters. Further reduction of the Bank of Russia's key rate as inflation declines and the situation in the Russian financial market stabilises will contribute to an overall improvement in lending conditions for Russian exporting companies in need of borrowed funds.

Adverse changes in the business environment for companies producing and exporting non-resource non-energy products dictate the need for additional financial measures to support them.

One possible area for such support is to increase the role of specialised refinancing mechanisms in the system of monetary policy instruments [20]. The use of specialised instruments of the Bank of Russia would contribute to the structural transformation of the Russian economy towards the development of high-tech industries.

Targeted support for Russian exports is currently provided through a mechanism allowing lending institutions to refinance loans extended to exporting companies for which JSC "EXIAR" has provided collateral in the form of an insurance contract. This instrument is important from the point of view of the tasks formulated in the national project "International Cooperation and Export" and could create additional incentives to intensify lending to companies exporting non-resource non-energy products. However, at the moment the degree of utilisation of this mechanism by lending institutions remains generally low. As of August 1, 2022, the volume of banks' debt to the Bank of Russia under the instrument in question amounted to 52.6 billion roubles.[7] Improving the efficiency of this instrument provides for stepping up the issuance of loans secured by JSC "EXIAR's" insurance contracts and meeting the Bank of Russia's requirements. The solution of this task implies

[6] Interest rates on Bank of Russia rouble transactions. Bank of Russia website. URL: https://www.cbr.ru/Content/Document/File/35860/rates_table.xlsx

[7] Bank of Russia's requirements to credit institutions for specialised refinancing facilities Bank of Russia website. URL: https://www.cbr.ru/hd_base/specref/

an increase in the volume of insurance support to export-oriented industries by "EXIAR" JSC.

In addition, in the current circumstances, it seems possible to consider lowering the rate on loans secured by a pledge of receivables under loan agreements secured by insurance contracts of "EXIAR" JSC to 4%. The rate of 4% was applied by the Bank of Russia when providing financing secured by loans secured by guarantees of "SME Corporation" JSC aimed at supporting SMEs affected by the coronavirus.

The active use of the Bank of Russia's specialised refinancing mechanism aimed at supporting Russian exports can create additional incentives for lending to export-oriented industries and conditions for companies to develop in the new situation. At the same time, in the long term, as the goals of the national project "International Cooperation and Export" are fulfilled, the Russian financial market develops and the capital of credit organisations grows, the significance of the Bank of Russia's specialised refinancing instruments will diminish.

Improvements in the payment system facilitate the achievement of monetary policy objectives, create conditions for economic development in the new environment, and allow companies engaged in foreign economic activities to optimise their settlements and manage their own liquidity.

Given the inaccessibility of international financial market instruments to Russian companies and banks subject to sanctions, as well as the actual impossibility for many companies engaged in foreign economic activities to pay in dollars and euros, one important area for the development of the payment system is to create conditions for settlements in national currencies of friendly countries.

Supporting the transition to national currencies in foreign economic activity involves the possibility of connecting credit institutions of friendly countries, including the banks of EAEU countries, to the Bank of Russia payment system. Ensuring the accessibility of the Bank of Russia's payment and settlement services to foreign counterparties, provided that risk control is ensured, is important both in terms of promoting Russian exports and in the context of increasing the role of the rouble in settlements with friendly countries. Expanding non-residents' access to the Bank of Russia payment system also creates conditions for increasing the export of payment services and expanding financial cooperation between countries.

The development of the "MIR" payment system is an element of support for foreign economic activity under unfavourable external factors and involves the expansion of partnerships with friendly countries to make payments and settlements with foreign counterparties. In this context, an important task is to increase the number of countries in which settlements can be made with the "MIR" card, as well as to create conditions for making settlements in this payment system not only in roubles, but also in the currencies of friendly countries.

Expanding the practice of connecting non-resident banks from EAEU and SCO (The Shanghai Cooperation Organization) countries to the Bank of Russia's System for Transfer of Financial Messages (Financial Message System — FMS)[8] — is an important area for the Russian financial system and the adaptation of exporters to the new conditions of foreign economic activity.

To date, all major Russian banks have joined the System for Transfer of Financial Messages. Despite the fact that foreign legal entities have also joined the System, the activities of the System for Transfer of Financial Messages are largely focused on ensuring payments and

[8] Bank of Russia financial messaging system. Bank of Russia website. URL: https://www.cbr.ru/Content/Document/File/92866/SPFS_16032022.pdf

settlements between Russian counterparties in the domestic market. The development of the infrastructure of the System for Transfer of Financial Messages envisages the strengthening of interaction between the payment systems of friendly countries and the creation of opportunities for international payments in the respective currencies.

The use of national currencies in settlements with friendly countries dictates the need to resolve problems related to the possibility of funding in these currencies, concluding transactions in these currencies against roubles, and the availability of currency risk hedging instruments for companies and banks. In particular, creating favourable financial conditions for increasing Russian exports implies developing an exchange segment of the Russian currency market. The Bank of Russia as well as development institutions could become market makers for expanding the list of traded currencies and improving liquidity of exchange trade. The availability of a sufficient level of liquidity in the segment of trading currencies of friendly countries against rubles on the Russian foreign exchange market is a prerequisite for expanding their use by Russian exporters. In addition, from the point of view of supporting Russian companies' foreign economic activities, it is important to preserve the possibility of concluding transactions in currencies of friendly countries against US dollars and Euros on the Russian currency market.

The necessary scaling up of development institutions in terms of export support will require both an increase in their capital and sufficient capacity to attract funding from the Bank of Russia against purchased bonds and issued loans. In order to improve export support measures, it is necessary for the Bank of Russia to conduct an effective macro-prudential policy to ensure the stability of the financial system and prevent the accumulation of excessive risks in certain sectors of the economy. In addition, maintaining the financial stability of development institutions in the long term involves continuing to improve the quality of corporate governance, including risk management.

The Bank of Russia's support for Russian banks to enter financial markets of friendly countries and develop their businesses in new directions is also important in terms of creating conditions for reorienting our exporters to new markets. Expanding cooperation with the financial regulators of friendly countries will reduce barriers to the development of Russian banks' business, which is necessary, inter alia, to support exports.

Conclusion of swap agreements between the Bank of Russia and central banks of friendly countries will create additional conditions to increase trade volumes and expand the use of national currencies in trade, will increase financial support for foreign trade operations by banks, will provide credit institutions with necessary funding for them in respective currencies, and strengthen financial cooperation between credit institutions of agreement signatories.

CONCLUSIONS

The key role in Russia's system of state support for exports belongs to development institutions, whose activities are focused on fulfilling the tasks set out in the national project "International Co-operation and Export", as well as the "Priority Action Plan to Ensure Russian Economic Development under External Sanctions Pressure". The financial products and services of Russian development institutions, which combine lending, insurance and the provision of guarantees, are in line with global practices of organisations providing export support. At the same time, Russian development institutions are faced with the task of facilitating the

restructuring of the Russian economy and exporters' activities in the new environment both by increasing the volume of support and by developing new products. Increasing the capital of development institutions is important from the point of view of the possibility of strengthening support to exporters in the context of adverse external factors.

Key areas for developing financial mechanisms to support exports also include: expanding the practice of providing financial services to foreign buyers of Russian products; developing the rouble syndicated lending market; providing financial services by development institutions to suppliers of products needed by Russian exporters; and using instruments of the Russian bond market.

The Bank of Russia's policy is important to enhance the export potential of Russian companies.

The conclusion of swap agreements between the Bank of Russia and the central banks of friendly countries will create additional conditions to strengthen trade and economic cooperation and facilitate access for Russian economic entities to funding in the respective currencies.

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Synergy of State Support and Novel Approaches to Implementing the Diversification Strategy by Defense Industry Companies

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ABSTRACT

The study's aim is to identify the features of interaction between state structures and companies of the military-industrial complex (DIC) in the course of diversification. Many scientific papers devoted to various aspects of this process show the need for its comprehensive study. Russian publications comment on certain aspects of these interactions. However, the approaches and initiatives of the dominant corporations of the military-industrial complex to carry out diversification, being supported by the state, have not yet fallen on the radar of analysis. The author focuses on solving the problem of removing institutional barriers that hinder the scale and direction of diversification. Also, the study updates new solutions for an active policy of stimulating and expanding the production of civilian products. The author identifies the specifics and advantages of unconventional methods in defense companies. The methodological basis of the work is an institutional approach using a structural and logical analysis. The author highlighted the research methods for using of systematization, grouping, comparative analysis. The paper reflects the results of monitoring relevant approaches to implementing the diversification strategy in state defense corporations. The research showed that it has to increase the share of civilian production for the successful implementation of plans as well as to change the fiscal model for the development of the defense industry to an investment-motivational one. The findings and results obtained indicated scientific novelty and may interest in leading defense companies in order to adjust their strategies, as well as to state agencies in the formation of state policy in defense industry diversification.

Keywords: military-industrial complex (MIC); diversification; institutional barriers; import substitution; dominant companies; government measures to support enterprises

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INTRODUCTION

The defence-industrial complex is one of the leading sectors of the manufacturing industry, where Russian companies have full control of the market for end products. It produces about 70% of all domestic science-intensive products [1]. High-tech potential of defence-industrial complex allows not only to effectively carry out processes of diversification and import-substitution, but also to create competitive goods, oriented both on the Russian and foreign markets.

Despite the legislative and organisational measures that have been taken, the DIC's diversification problems have not yet been fully resolved. A wide range of instruments has already been created to increase the share of civilian products manufactured by defence enterprises, but a number of issues remain open. It is these issues that attract the attention of many researchers, each of whom focuses on a particular aspect of diversification. M. Remizov emphasises the national character of the defence-industrial complex diversification, which is difficult to achieve with a consistent reduction of expenditures on the defence industry [1]. A. D. Murukina and L. M. Tipner focus on the analysis of internal and external factors of conversion success [2]. There are works where the authors draw attention to the risks of not providing defense industry enterprises with the necessary financial resources to implement diversification [3, 4]. E. A. Antipina, D. A. Zhurenkov and M. A. Sheloumov focus on the innovation infrastructure of diversification, arguing that a promising solution to this problem is the cooperation of participants in a common value chain, located in a certain territory and having a certain specificity in the form of dual-use scientific and industrial clusters [5]. A. E. Varshavsky and M. G. Dubinina focus on assessing the impact of civilian production on the efficiency of the military-industrial complex, based on both foreign and Russian experience in diversification [6]. The works [7, 8] examine the estimation of defense industry enterprises' readiness for diversification and the strategy of its management using dual-purpose technologies. There is also an analysis of foreign approaches to diversification with the allocation of business models in its implementation, where examples of companies are given [9].

Nevertheless, despite the huge number of publications in the sphere of military-industrial complex enterprises' diversification, it seems that the problems associated with the specifics of interaction between the authorities and defense industry companies in the course of diversification of their civilian production activities need to be brought up to date.

Under the conditions of fierce competition on the markets of civilian products and services, Russian defense industry companies have become very creative in forming new approaches to diversification strategy, liquidating, and supplementing their assets, choosing financial mechanisms and industry focus of civilian production. The article provides a radar analysis of new approaches by initiative "from below" on the example of dominant companies in the military-industrial complex. It shows that relevant approaches could be fully implemented only with massive institutional and financial support from the government.

THE ROLE OF DIVERSIFICATION IN A COUNTRY'S TECHNOLOGICAL SOVEREIGNTY POLICY: INITIATIVES FROM ABOVE

In contrast to the conversion of defence enterprises in the 1990s, caused by a complete lack of financial resources for further development, the modern diversification of the Russian DIC occurred due to other factors. The most important among them

are the expected relative reduction of the state defense order in connection with the completed military rearmament cycle [10], as well as the urgent need to use progressive technologies to eliminate the dependence of production chains on the pre-dominance of imported components. Diversification, unlike the strategy of import substitution, which produces goods that are well adapted to the world market, involves the transition to the production of the next technological level, to the economy of high-tech profitable projects [11, 12]. In the long term, this would enable defence enterprises to obtain additional income, create modern jobs and implement important dual-use technologies [13, 14].

Since 2018, the dynamic development of diversification processes has been facilitated by the inclusion in national projects, substantive linkage with import substitution processes, a systematic approach to diversification management and its legislative formalization. In 2018–2020, the civilian segment of the defence-industrial complex had stable dynamic characteristics — the average annual growth rate of civil and dual-use products was 4.1%, their share in the total output of the defence-industrial complex increased from 23.1% to 25.6%, and in 2021, according to experts, the share of the civil segment was at least 26.2%.[1]

The systemic approach to diversification management that has developed in recent years with the adoption of national projects has made it necessary to identify diversifiable companies in the defence-industrial complex by separate groups in each industry, taking into account the structure of national import-substitution plans.

Against the backdrop of ongoing and intensifying restrictions by Western countries, the Russian Ministry of Industry and Trade approved a new import-substitution programme for industry in 2021. Unlike the previous one (2014–2020), the sectoral plans for import substitution measures are specified according to about 800 technological directions of import substitution, the degree of probable involvement of defense industry companies based on their existing sets of competencies (*Table 1*). The technological areas are represented by three functional blocks: end products; raw materials, materials, and components; equipment and means of production.[2]

An important point for defence-industrial complex enterprises in the sectoral plans for import substitution is the guaranteed demand for the presented items, including priority products for the implementation of national projects, state programmes and sectoral strategies of the Ministry of Industry and Trade of the Russian Federation.

Against the background of the technological blockade, there has been a paradigm shift with respect to diversification in 2022.[3] Whereas during the last six years it was viewed as a hedge against financial instability of the defence-industrial complex companies against the background of a possible decline in the volumes of the state defense order, the current economic realities together with the import substitution processes make it a signal component of the defence-industrial complex and industrial productions development. At the same time, a national technological audit of diversification strategies by the military-industrial complex companies is urgently needed. It may involve experts from three areas: military-industrial (Military-Industrial Commission of the Russian Federation Ministry of Defense, Russian Federation Ministry of Industry and Trade), venture financing ("Skolkovo") and

[1] Development of Russia's DIC diversification processes in 2021. URL: https://rustechnology.ru/diversification/razvitie-protsessov-diversifikatsii-opk-rossii-v-2021-godu/

[2] Ibidem.

[3] URL: https://www.kommersant.ru/doc/5358214?query=Фрадков%20диверс/ификация%202022

Table1

Possible industry directions of participation of defense industry companies in import substitution processes

Technological areas of import substitution in Russian manufacturing industries	Number of items
Total:	800
Including a set of competences in the DIC for the development of import substitution processes in selected sectors:	
Oil and gas mechanical engineering	109
Automotive industry	100
Chemical industry	93
Shipyard construction	92
Agricultural machine construction and engineering	73
Heavy engineering	50
Production of construction, road, municipal, forestry and ground aerodrome equipment	48
Power engineering, electrical and cable industry	47
Pharmaceutical industry	38
Machinery for the food and processing industry)	37
Civil aircraft construction	30

Источник / Source: составлено автором по: URL: https://rustechnology.ru/diversification/razvitie-protsessov-diversifikatsii-opk-rossii-v-2021-godu / compiled by the author based on: URL:.https://rustechnology.ru/diversification/razvitie-protsessov-diversifikatsii-opk-rossii-v-2021-godu

marketing of high-tech products and high-tech services (Scientific development and production center "Conversion"). Its results "should be the formation of thematic foresight maps, determining the innovative guidelines for business in the defense industry, as well as the routing of development of high-tech potential of specific enterprises". [16].

In 2020–2022, institutional measures such as the improvement of the contractual system, the introduction of restrictions and bans on the use of foreign goods and services (both for Russian defence and civilian enterprises) for state needs, changes in the regulation of prices for products supplied under the SDO (State Defence Order), reducing their dependence on imports, etc. became significant factors of financial protection of defense industry enterprises (*Table 2*).

Acceleration of technology transfer from the military to the civilian sphere could be a significant factor for additional increase in the volume of high-tech products and the launch of new diversification projects. At the same time, the Russian legislative restrictions in force until 2022 did not allow the full use of dual technologies and their refinement for the production of serial civilian products [17].

In 2021, the RF Ministry of Industry and Trade, Federal state unitary enterprise, nationwide research and development centre "Tsentr" with the participation of a

Table2

Institutional support for diversification and financial security of defense industry enterprises in Russia 2020–2022

Institutional measures in implementing diversification	Name and focus of the regulatory initiatives
Renewal of the backstop programme for backbone enterprises under the sanctions' regime	Resolution No. 296 of 06.12.2022
A package of new changes to regulate product prices. The obligation to provide information on the price of products under the state defence order to the lead contractor, the state customer, has been enshrined. DIC companies are compensated for higher metal prices.	Decree of the Government of the Russian Federation of 23.08.2021 No. 1388 "On Amendments to the Regulation on State Regulation of Prices for Products Supplied under the State Defence Order". Federal Law No. 275-FL of February 16, 2022 on Amendments to the Federal Law on State Defense Order. Draft Resolution of the RF Government "On Amendments to the Rules for keeping separate accounting of results of financial and economic activities by entities involved in state defense order" of 22.04.2022. Federal Law of 11.06.2022 No. 172-FL "On Amendments to the Federal Law 'On the State Defense Order'".
Development of technology transfer	Decree of the Government of the Russian Federation of 28.10.2021 No. 1845 "On Approval of the Rules for Keeping the Register of Results of Intellectual Activities Directly Related to Defence and Security". Order of the Minister of Defense of the Russian Federation of 17.01.2022 No 22 "On Approval of the List of Information of the Russian Federation Armed Forces Subject to Official Secrets in Defense".
Reducing import dependency	Order of the Ministry of Industry and Trade of 19.04.2022 No. 1532 Parallel Imports 2022 — List of Goods. Federal Law No. 213-FL of 28.06.2022 on "Parallel Imports"
Use of the results of space activity in the interests of economic modernisation of the Russian Federation and the development of its regions for the period up to 2030.	Federal Law No. 76-FL of 01.04.2022 "On Amending the Federal Law 'On State Corporation for Space Activity Roscosmos'". Effective date: 12.04.2022. Approved action plan for 2022–2025 for implementation of Fundamentals of state policy in sphere of application of space activity results for the benefit of Russian economy modernization and development of its regions till 2030
Preferential treatment when processing the SDO	Decree of the Government of the Russian Federation of 03.12.2020 No. 2013 "On minimum share of procurement of goods of Russian origin" determining the list of goods for which the minimum mandatory share of procurement (of the annual volume of procurement attributable to such goods) is established. Decree of the Government of the Russian Federation of 13.12.2021 № 2273 "On Amendments to Regulation on exemplary conditions of state contracts (contracts) on state defense order". Decree of the Government of the Russian Federation of 04.03.2022 No. 408-r on permitting state customers for state defence procurement to conclude contracts with single suppliers at indicative (estimated) prices

Источник / Source: составлено автором по URL: https://academiagoz.ru/docs и URL: https:// http://government.ru/sanctions_measures / compiled by the author based on URL: https://academiagoz.ru/docs and URL: https:// http://government.ru/sanctions_measures/

number of state corporations and defense industry companies developed a package of draft regulations on the introduction into civil circulation of scientific and technological reserve, created during the execution of the state defense order tasks, on commercialization of intellectual activity results in defense industry organizations (*Table 2*).[4]

Technical cooperation within the framework of international programs of the defense industrial complex enterprises with friendly partner countries (India, China, etc.) can become an additional impetus in the sphere of technology transfer.

At the same time, it appears that some confidentiality should be established and maintained in the sphere of purchases by the DIC organizations of materials and components necessary for the development and manufacture of civilian products, to ensure and protect their commercial interests.

Among the new measures to support the development of diversification processes initiated "from above" and adopted in April 2022 are the following:

- Prompt elaboration and adoption of a legislative act to automatically extend the period of validity of Russian origin certificates by three years. This will allow defense industry enterprises to receive preferential treatment when entering into contracts.
- Additional capitalization of the Industry Development Fund, providing additional opportunities for defense industry companies to finance new diversification projects.
- The emergence of a program of direct financing of DIC projects by entering the authorized capital of an enterprise with subsequent purchase of this share by the state. The term of state funds for DIC diversification is up to 10 years.
- Adjustment of operational plans for timely implementation of state programmes "Development of the Aviation Industry", "Development of Shipbuilding and Technology for the Development of Offshore Fields (shelf deposits)", "Development of the Electronic and Radio electronic Industry", "Development of the DIC" in order to prevent negative consequences for the Russian economy". [15].

DIVERSIFICATION STRATEGY IN THE DEFENCE INDUSTRY: INITIATIVES "FROM BELOW"

When diversification is carried out in the companies of the military-industrial complex its growth rate and results depend largely on the motivating system of me-management. Efficiently conducted diversification of the military-industrial complex will help to minimize economic risks and enable companies to become financially protected [18]. Production of competitive products and services by defense industry companies for the domestic civilian market and exports allows them to compensate financial flows used to repay debts of previous periods and to obtain opportunities for investment in the production of civilian products [19]. Many companies in the defence sector are trying to reformat their production programmes in this direction.

In recent years, the creativity of the management of corporate structures of the military-industrial complex and the use of the project approach to diversification management have led to new approaches in expanding the production of high-tech civilian products. These include:

1. *"Buy and build" or the purchase of missing civilian assets.* This approach is characteristic of a state-based company "Rostech", which has good financial resources.

In 2019, Rostech State Corporation added a stake in high-tech railcar manufacturing

[4] Development of Russia's DIC diversification processes in 2021. URL: https://rustechnology.ru/diversification/razvitie-protsessov-diversifikatsii-opk-rossii-v-2021-godu/

assets to Uralvagonzavod (UVZ),[5] having completed the acquisition of a stake in United Wagon Company (UWC; 9.33%) from ICT Group (Investment management company). This M&A transaction[6] (one of the largest in the Russian railcar industry) has strengthened UVZ's railway rolling stock production business and contributes to achieving Rostech's 2025 civil products strategy targets, namely, to increase its share to 50%.

Another Rostech project is the purchase of important assets related to the implementation of the Russian high-capacity gas turbine project.[7] Despite the need to produce exactly domestic equipment for critical infrastructure, Russia has not yet been able to achieve mass production of high-capacity turbines. In early 2020, the Rostech State Corporation established ODK — High-Power Turbines, which is capable of serial production of GTD-110M gas turbines (2 per year), their delivery to the customer, and repair and maintenance services throughout the turbine's life cycle. In June 2020, Rostech State Corporation decided to consolidate GTD-110M production in its hands by buying back shares from "Inter RAO" — 52.95% and Rusnano State Corporation — 42.34%.

2. *Strengthening of the existing area of civilian production.* This is characteristic of the United Engine Corporation (UEC, part of Rostech State Corporation), Roscosmos and others.

In the civil products segment, UEC is pursuing two major areas of diversification.

The first involves an increase in annual production of new aircraft engines for civilian aircraft PD-14 and PD-35. UEC will ramp up production of PD-14 engines for Irkut Corporation to 50 aircraft for installation on MS-21 medium-range commercial aircraft by 2025 and will start serial production of new aircraft engines PD-14 at UEC-Perm Motors in 2020–2021 in cooperation with other companies. The plant strives to receive the certificate for production of the PD-14 engines in compliance with the European norms and rules after completion of the audit by the European Aviation Safety Agency (EASA) in 2020. Concurrently with the audit, UEC is seeking to establish an after-sales service network for the new PD-14 aircraft engine by 2030, with the financial support of the Russian Ministry of Industry and Trade in the amount of 36 billion rubles. At the first stage of the after-sales service creation it is necessary to form a pool of reserve and replacement engines. The second stage includes the creation and filling of spare parts depots, the organization of repair production, modular repair points in the main aircraft operation areas, and the production of the PD-35 engine with 35 ton thrust for installation on the Russian — Chinese CR 929 long-range wide-body aircraft. The civil engine will be certified in 2027, with testing starting in mid-2023.[8]

The second area of diversification at UEC is the supply of gas turbine units for PJSC Gazprom's Power of Siberia gas pipeline. In 2019, demand for engineering products (onshore gas compressor units from Gazprom, their services, and repair services) increased sharply by about 20–25% compared to 2018. In 2019, UEC will deliver eight 16MW machines, in 2020, thirteen 25MW machines, and in 2021 over 20 gas-turbine units for the "Power of Siberia".[9]

Another example of using this approach is increasing the production of lifts as part

[5] URL: https://www.kommersant.ru/doc/3836740

[6] Mergers and Acquisitions.

[7] URL: https://finance.rambler.ru/other/44488277/?utm_content=finance_media&utm_medium=read_more&utm_source=copylink

[8] UEC to start serial production of new PD-14 aircraft engines in 2020. URL: https://tass.ru/ekonomika/6747841; Tests of the new PD-35 civil aircraft engine will start in 2023. URL: https://tass.ru/ekonomika/6748425

[9] UEC (United Engine Corporation) to deliver more than 20 gas turbines for the "Power of Siberia" by 2021. URL: https://tass.ru/ekonomika/6747817

Table 3

The range of relevant approaches to implementing the diversification strategy in defense industry companies

Relevant approaches	Content	Advantages
1. "Buy and build-in" or the purchase of missing civic assets	Acquisition of a stable civil engineering company platform and subsequent purchase of necessary additional companies at favourable prices	High bargaining power of the platform company: access to the established customer and supplier networks
2. Strengthening the existing civilian production line	Integration of a platform company with the hope of high profitability in the long term. Availability of an experienced management team during the integration period (before and after the merger) and accurate execution of the business plan	The synergistic effect of integration will allow the military and defence industry to take a larger market share in relevant civilian products in the future
3. The formation of new capacities to produce the goods demanded by the market within a single company	Switching to products, goods and services that are in demand by end users (IT products, pharmaceuticals, medicine, etc.)	Guaranteed income, regardless of various factors (financial, macroeconomic, etc.); fast return on investment, high profitability
4. Establishment of wholly civilian-oriented subsidiaries	Within integrated structures, formation of specialised subsidiaries for the implementation of dual-use technologies in the civil sector	Short timeframes for investment and less risk than a primary investment
5. Creating a groundbreaking new direction for the production of civilian vehicles	Development of a modern range of vehicles based on a single unmanned modular electric platform	The application of ESG standards in the manufacture of civilian products. Implementing such projects is the answer to the major challenges of the fourth energy transition

Source: compiled by the author.

of the diversification at Roscosmos. Ust-Katavsky Carriage Works (UKVZ, part of the United Rocket and Space Corporation) has completed the certification procedure for lifts of its own production. By the end of 2020 JSC UKVZ plans to reach the production of 50 lifts per month. By 2025 the plant expects to produce 5 thousand lifts per year in different configurations (from simple to luxury) and supply them to all regions of Russia. Within the framework of diversification, the enterprise is mastering production of high-speed railway platforms. The markets that UKVZ plans to enter are promising, but highly competitive, and yet, according to experts, the plant will be able to occupy its niche.

3. *The formation of new capacities for the production of goods demanded in the market within a single company.* One of the largest Russian aircraft building companies, "Aviakor",[10] — will be the first in Russia to start manufacturing aviation containers in cooperation with suppliers of aluminum products. Until recently neither aviation containers, nor pallets for transportation of air luggage were produced by Russian companies. Having analyzed the market, "Aviakor" was the first Russian company that made the decision to expand its own range of civil products and start manufacturing aircraft containers for luggage transportation on its own premises. The staff has undergone all the necessary training for production of a new product for the plant. The company plans to pass the certification procedure in compliance with European Aviation Safety Agency (EASA) norms due to the fact that the Russian civil aviation mainly operates aircraft of foreign manufacturers. This will allow "Aviakor" to fill

[10] URL: https://tass.ru/ekonomika/6748062

Table 4

Business centers in Russian defense industry corporations and their specialization

Location of business centres	Business centre areas of operation
1. PJSC UAC ("United Aircraft Corporation" Public Joint Stock Company)	Phased development of projects in the civil segment (within 7 business areas), including: civil aircraft construction; import substitution of components and materials (Russian share after 3 years – over 63%); development of composites and materials for work in aggressive environments
2. JSC "United Engine Corporation"	Integration of 5 business structures into a holding company on a contractual basis. It will test import-substituting engineering products and their potential for growth by 2025: gas turbine internal combustion engines for cars (to replace up to 50% of imports); gas-transporting pumps (60%), mobile hybrid power plants for operation in difficult climatic conditions (42%)
3. "United Shipbuilding Corporation" JSC	A property holding company based on 12 business centres. Its goal is to increase production of civilian vessels by 2025: hovercrafts by 40% and hydrofoils by 28%
4. "Almaz-Antey" Concern	A project group of 25 businesses will test the launch of: artificial intelligence systems for traffic control; UAV (uncrewed aerial vehicle/ unmanned aircraft system) production for re-equipping fire and rescue services; state-of-the-art technology for video monitoring and public safety

Source: [16].

a large market with its products, especially if the perimeter of the law enforcement practice is expanded in this direction.

4. *Establishment of subsidiaries focused entirely on the civilian sector*. Spin-off of subsidiaries as independent business units with a portfolio of high-tech services and products for the civilian sector. This restructuring of assets motivates the subsidiary to develop its civilian product line and form a highly profitable portfolio of high-tech products. Separation of the subsidiary allows in the process of budgeting to assess the efficiency of its functioning as a whole and the financial performance of individual activities.

As an example of such an approach to the implementation of state corporation diversification is the creation of a commercial operator of geoinformation services TERRA TECH by "ROSKOSMOS" SC.[11] These services are designed to assess the volume of economic activity of the RF constituent entities within the framework of the "Digital Economy programme".

"Roscosmos" SC subsidiary TERRA TECH has a niche in the services market in the spatial data analysis sector. Among the innovations are: continuous scanning of agricultural land data, monitoring of agricultural land resources, continuous monitoring of forestry activities, changes in construction facilities and infrastructure. In addition, TERRA TECH will forecast potential property or land taxes, use cloud technology and the RSS (Russian Space Systems) data centre.

5. *Creating a ground-breaking new direction for civilian production*. For example, "Almaz-Antey", which produces surface-to-air missile systems (S-300PM, S-400 and S-500), has created a wide range of vehicles powered by alternative fuel sources (electric vehicles, gas vehicles and hydrogen vehicles).[12] On the

[11] "Roscosmos" has created a commercial operator of services based on remotely sensed data. URL: http://russianspacesystems.ru/2018/02/21/roskosmos-sozdal-kommercheskogo-operatora-dzz. Roscosmos company certified to produce lifts. URL: https://tass.ru/ekonomika/8632787?

[12] A Russian manufacturer of anti-aircraft systems will produce a civilian electric gas vehicle. URL: https://www.vedomosti.ru/business/news/2021/09/21/887523-proizvoditel-s-400-almaz-antei-reshil-proizvodit-elektromobili-e-neva

basis of a single unmanned modular electric platform, a modern line of vehicles has been offered: a B+ class urban electric vehicle, a light commercial electric vehicle, hybrids with a gas or hydrogen extender.

The company has registered the design of the E-NEVA hybrid gas-electric vehicle, which is a purely civilian product, as natural-gas-based motor fuel is not used for military purposes. The use of combined power units, e.g., gas-electric, would substantially increase the range of the vehicle.

For example, the fuel system of a gas vehicle with electric transmission provides a range of 1000 km on a single fill-up, and the fuel system of an electric hybrid vehicle includes a 70-kW battery and a 52-litre gas tank, which provides for an 810 km range with electric recharging.

In addition, at the end of 2022, Ust-Katavsky Carriage Works (UKVZ), an enterprise of Roskosmos Group, will start assembling the first pilotless high-speed tramcar. On the basis of a single platform for the spaceport staff, modern three-section, five-section, low-floor tram cars will be used. A project to build an unmanned city tram on UKVZ's premises and capacities is also under consideration.[13]

An analysis of relevant approaches to diversification using the example of the dominant military-industrial complex companies ("Rostech", "Roscosmos" and "Rosatom", and aerospace defence conglomerate "Almaz-Antey") allows them to be differentiated and identify specifics, i.e., the merits of each (*Table 3*) and common metrics, including:

- certification procedures for civilian products [under European Aviation Safety Agency (EASA) or Russian standards], which makes them more competitive;
- a guaranteed market for civilian products (by state or intergovernmental agreements, tied contracts, etc. along with mandatory quotas on state procurements and purchases for the military-industrial complex);
- financial assistance from the state to a greater or lesser extent, with some exceptions.

CONCLUSIONS

Despite the unprecedented anti-Russian sanctions in 2022, defense industry companies continue to dynamically increase the production of high-tech civilian and dual-use products. In the new realities, it is more important than ever to place maximum emphasis on providing the country with high-tech products that are leaving the Russian market due to sanctions.

A number of significant legislative and institutional support measures on the part of the state, the backbone banks of the defense industry, and development institutions contribute to this. According to estimates by the Ministry of Industry and Trade, the potential contribution to the Russian economy as a result of the diversification of the military-industrial complex could be approximately RUB 1 trillion by 2030.[14]

In the changed geopolitical conditions, the military-industrial complex companies become the basis for easing the technological blockade. The real advantages of military-industrial complex enterprises in the current economic conditions are the possession of competences, human resources, and the ability to create new promising products. Business centres have begun to be formed within large corporations to test the launch of competitive high-tech new generation products intended for the civilian sector of the economy (*Table 4*). They function either as

[13] "Roscosmos" company to start assembling unmanned tram at the end of the year. URL: https://iz.ru/1320966/2022–04–15/predpriiatie-roskosmosa-nachnet-sborku-bespilotnogo-tramvaia-v-kontce-goda

[14] Ministry of Industry and Trade: Diversification of the military-industrial complex will bring 1 trillion rubles by 2030. URL: https://rg.ru/2022/04/08/minpromtorg-diversifikaciia-opk-prineset-1-trln-rublej-do-2030-goda.html

independent units within a corporation, or as a project group, holding or pool of enterprises capable of offering truly competitive high-tech products, often unparalleled in the world.

The emerging portfolio of civil projects, new approaches to implementation of diversification strategy in the defense industry companies will make a significant contribution to ensuring technological sovereignty of the country with guaranteed sales of innovative products. Especially if the existing diversification management system in 2023 begins to be guided by the State Program of defense industry companies (DIC) diversification, which will provide for a single state plan for production of civil and dual-use products.[15]

[15] The adoption of a new Russian State Armaments Programme in 2023 may well be linked to a programme document on diversification. Borisov announces the emergence of a state programme to diversify the military-industrial complex. URL: https://www.rbc.ru/politics/30/11/2018/5c01319a9a794785bc58a6ea

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Comparative Analysis of Russian and Foreign Experience of Unmanned Aerial Systems State Regulation

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ABSTRACT

Nowadays, there have been various fields of human life and economic activity used unmanned aerial vehicles (UAVs) and unmanned aerial systems (UAS) based on them. The capabilities of modern UAVs allow them to become participants in air traffic, which implies regulation of their creation and use by the state. However, regarding rapidly developing technologies, state regulators do not always keep pace with transforming realities in their decisions, both in the Russian Federation and in other countries of the world. The paper considers state regulation issues of the UAS development, their certification, registration, operation, as well as ensuring the safety of use in Russia and abroad in order to assess the possibilities for further development of legislation to achieve a compromise between the needs of the state, private business and citizens in this field.

Keywords: unmanned aerial vehicles; unmanned aerial systems; unmanned aircraft; UAV; BASS; BVS; state regulation

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UNMANNED AERIAL SYSTEMS IN THE CONTEXT OF THE DIGITAL ECONOMY

In recent decades, modern technology, especially information technology, has penetrated virtually all spheres of human life and professional activity, qualitatively radically changing many of them. The process of digitalisation, both in its importance for the individual and society as a whole, and in its rate of formation, is unparalleled in history. In connection with this circumstance, the concept of digital economy is naturally formed, which is now understood not only as the circulation of information goods and services (as it was just a decade ago), but a fundamentally different paradigm of economic and social structure, based on the penetration of information technology in all areas of human life and development based on its wide application of a global network of economic and social activities [1]. At the same time, the scale and pace of its development cannot be ignored by the state and business, for they face the urgent tasks of adapting to new economic behavior and the need to change strategies and functions of public authorities. Such challenges evidently require proper legal support for new economic mechanisms, which in recent years has been taken into account by the leaders of most developed and developing countries, including the Russian Federation. In particular, at the plenary session of the St. Petersburg International Economic Forum in 2022, Russian President V. V. Putin stated the need to "form a fundamentally new, flexible regulatory framework for the implementation of digital technologies in all spheres of life".[1]

In turn, the lack of proper legal support for the digital economy may not only hinder the unlocking of its potential, but also create risks for both business and public administration [2]. The importance of these risks increases in those sectors where modern technologies do not form new branches of human activity, but significantly modify the existing ones. These include the use and exploitation of unmanned technologies.

Unmanned aerial vehicles and unmanned aerial systems based on them are not a new phenomenon in the technical sense. Until recently, however, their scope of application has been relatively limited: on the one hand, limited to specific projects in the military and aerospace industry and, on the other hand, limited to aeromodelling. Technological advances that have significantly increased the manoeuvrability, autonomy, and range of UAVs and at the same time have reduced the size and cost of UAVs, led to their literally explosive proliferation in a variety of fields of human life and economic activity. UAVs have begun to be widely used in commercial projects (for cargo deliveries, video and photography, topographic and geodetic surveys, application of pesticides and fertilizers in agriculture, etc.) and at the state level, for example in emergency response and rectification of the consequences. UAVs also continue to be used for sports and recreational purposes and, due to their increasing accessibility and ease of use, they are increasingly being purchased by people who have nothing to do with organised aeromodelling and who have very little understanding of the legal situation they face when using high-tech "toys".

Therefore, it cannot be denied that UAVs today can have a significant impact on maintaining public order and helping to save lives [3]. As part of the "technology of the future", they can not only simplify, but also radically change the lives of society and individual citizens [4]. In addition, the Rosaviation has noted a steady increase in

[1] URL: https://forumspb.com/news/news/vladimir-putin-postavil-zadachu-dobitsya-v-rf-vseobshchey-tsifrovoy-gramotnosti/

the number of UAV violations of airspace, which is a threat. At the same time, private unauthorized launches of light UAVs near airfields and other air transport infrastructure are particularly dangerous [5]. But while such cases are usually due to legal and technical illiteracy of citizens, in a number of other situations the use of drones threatens law and order when used intentionally. In particular, they can be used for smuggling [6], delivering prohibited items to correctional facilities [7], filming secret and private objects [8], carrying out terrorist acts [9], etc. The mere possibility of a drone crashing or colliding uncontrollably with people, vehicles and other property of citizens is also a source of threat [10].

Thus, like many other innovative technologies, in a relatively short period of time UAVs, which were considered as specific devices of niche application, have become a phenomenon that requires addressing the issue of its legal status and state regulation, in full accordance with the opinion of S. G. Kamolov, who observes that "...innovation and information technology have become critical elements of modern management. Understanding new opportunities and risks <...> — is a pressing need for scientists and practitioners alike. <...> today, the state needs to answer the key question: how to protect the legitimate interests of every citizen in an era of digital standardisation and unification?" [11].

In recent years, a noticeable number of publications have appeared in the scientific literature concerning the creation, certification, accounting, and operation of drones, dealing with general issues of legal regulation of this sphere [3, 12–14], sectoral specifics of UAV regulation [9, 15, 16], international legal and comparative legal aspects of the problem [17–19], etc. Nevertheless, it should be noted that most of them refer to scientific periodicals and, most likely, are directed to the statement of the problem. At the same time, fundamental works, and dissertation studies on the regulation of unmanned systems, including aviation systems, are not currently presented in the domestic scientific literature.

As a contribution to the development of the mentioned problems, the author conducted a comparative study of state regulation of UAS development, certification, registration, operation, as well as ensuring the safety of UAS use in Russia and abroad in order to assess the possibility of further development of legislation to achieve a compromise between the needs of the state, private business and citizens in this area. Its general methodological basis was founded on the dialectical method of knowledge, purposeful and systematic approaches to the complex of problems under study. The specific methodology was based on the special methods of knowledge: comparative-legal, formal-logical, and formal-legal, as well as — abstraction, analogy, and legal modeling.

Most existing publications recognise UAVs as full-fledged participants in air traffic, which implies legal regulation of their creation and use by the state. However, with respect to rapidly evolving technologies, state regulators, both in the Russian Federation and elsewhere in the world, have not always kept up with the rapidly changing realities in making their decisions.

In the Russian Federation, for example, the relevant terminology is still not clearly defined in the legislation. The key legal act in the field of airspace exploitation and aviation activities in our country, — the Air Code of the Russian Federation[2] (AC RF), operates with the term "unmanned aircraft vehicle" (UAV), defining it as an aircraft controlled (managed) by a pilot who is not

[2] Air Code of the Russian Federation of 19.03.1997 No. 60-FL. URL: http://www.consultant.ru/document/cons_doc_LAW_13744/

on board. The term "aircraft vehicle" also appears in the Federal Rules for the Use of Airspace in relation to UAVs.[3] At the same time, some national standards, industry, and sectoral methodological and departmental documents[4] use the term "unmanned flying vehicle" interpreted in the same way as UAV. It should be noted that the domestic regulatory framework is currently unifying the terminology regarding UAVs by replacing the term "flying vehicle" with "aircraft vehicle" (for example, the Rules of Airspace have, until recently, included the concept of "flying vehicle").

International documents also reveal different approaches to fixing the conceptual framework in this field. In particular, the Convention on International Civil Aviation in Annex II "Rules of the Flights" uses the same terminology as in the Russian AC and provides a similar definition of the concept ("aircraft designed to fly without a pilot on board").[5] At the same time, Council Regulation of the European Union (EC) No. 428/2009 "On setting up a Community regime for the control of exports, movement, trade and transit of dual-use goods" operates with the concept of an "unmanned aerial vehicle".[6] It should be noted that this terminology is used more frequently in international legislation and regulations of foreign countries and tends to replace the term "aircraft".

The term "unmanned aircraft vehicle" is also almost always used in the specialized literature, which raises the question of whether this broad introduction of the term "unmanned aerial vehicle" into the domestic regulatory framework is appropriate. In addition to the obvious difficulties arising from differences in terminology, the use of such terms may create a number of other conflicts, in particular with respect to the legal regime of UAVs. For example, according to Article 130 of the Civil Code of the Russian Federation (CC)[7] aircraft subject to registration belong to immovable property. On the other hand, according to the Unmanned Aerial Vehicles Registration Rules,[8] UAVs with a take-off weight of 0.15 kg or more, i.e., including amateur (household) vehicles, are subject to such registration. This raises the question of extending to them other norms of the Civil Code of the Russian Federation relating to immovable property and the appropriateness of such an extension [20].

Nevertheless, despite the existing problems even in the area of terminology unification, it should be noted that the problem of legal regulation of UAVs and UAS in our country has recently received

[3] Decree of the Government of the Russian Federation of 11.03.2010 No 138 'On approval of Federal Rules for Use of Airspace of the Russian Federation' (with amendments and additions, in force from 09.06.2021).URL: http://www.consultant.ru/document/cons_ doc_LAW_98957/

[4] Letter dated 03.11.2009 from the Ministry of Regional Development of the Russian Federation No. 36576-IP/08 "On the acquisition and maintenance of an unmanned aerial vehicle". URL: https://docs.cntd.ru/document/902230744; GOST R 59926–2021/ ISO/IEC TR 20547–2:2018. National Standard of the Russian Federation. Information technology. Reference architecture for big data. Part 2. Variants of use and derived requirements" (approved and enacted by Rosstandart Order No.1685-st dated 02.12.2021). URL: https://docs.cntd.ru/document/1200182073; SRM 218.9.017–2019. "Sectoral road methodological document. Methodological recommendations on the production of aerial photographic work using unmanned aerial vehicles for road construction and reconstruction front end engineering design". URL: https://rosavtodor.gov.ru/storage/app/media/uploaded-files/odm-2189017–2019.pdf

[5] Travnikov A. I., Abashidze A. Kh., edited. International Air Law. A Textbook for Bachelor's and Master's Degree. Moscow: Publishing house Yurait; 2019. 444 p. URL: https://mx3.urait.ru/uploads/pdf_review/B 4F3D 6A0–7570–4555–9ACE-5228BBCC 9376.pdf

[6] Ibidem.

[7] Civil Code of the Russian Federation (Part One) of 30.11.1994 No. 51-FL. URL: http://www.consultant.ru/document/cons_doc_LAW_5142/

[8] Decree of the Government of the Russian Federation of 25.05.2019 No. 658 "On Approval of the Rules for Accounting of Unmanned Civil Aircraft with a Maximum Take-off Weight of 0.15 kilograms to 30 kilograms, imported into the Russian Federation or Manufactured in the Russian Federation". URL: https://base.garant.ru/72255560/

increased, albeit somewhat belated, attention. The norms regulating the legal status of UAVs/UASs first entered domestic legal usage only in 2015, when the Federal Law of 30.12.2015 No. 462-FL "On amendments to the Air Code of the Russian Federation regarding the use of unmanned aircraft" (the so-called "drone law").[9] In 2019, the Decree of the Government of the Russian Federation of 25.05.2019 No. 658[10] approved the Rules for Accounting of Unmanned Civil Aircraft, and the necessary amendments were made to the Rules of Airspace Use, approved by Russian Government Decree No. 138 of 11.03.2010.[11] An important year in terms of the development of the regulatory framework for the creation and operation of UAS was 2021, when national standards for the classification and categorisation of UAS (GOST R 59517–2021), their development procedure (GOST R 59518–2021), airworthiness requirements (GOST R 59751–2021) and a number of others were approved and enacted [21].

Special consideration should be given to the Concept of Integration of Unmanned Aerial Vehicles in the Common Airspace of the Russian Federation, approved by RF Government Decree No. 2806-d of 05.10.2021,[12] which is aimed at achieving such a state of air legislation and the air transport system that would allow unmanned and manned aircraft to fly in the common airspace at an acceptable safety level. This Concept defines the main directions for the integration of unmanned aircraft into the common airspace of the Russian Federation, the development of relevant technologies, and the improvement of the legal and regulatory and technical framework for the use of unmanned systems. The stages of integration of unmanned aerial vehicles into Russian airspace are regulated by the Concept until 2030; however, its provisions provide for the testing and approbation of such technologies using experimental legal regimes (ELR) in accordance with the provisions of Federal Law No. 258-FL of 31 July 2020 "On Experimental Legal Regimes in the sphere of Digital Innovation in the Russian Federation".[13] As part of the implementation of the above provisions, in March 2022 Decrees No. 458[14] and No. 462,[15] of the Government of the Russian Federation of 24.03.2022 were adopted establishing ELR in the field of digital innovation for UAS operation in a number of regions of the Russian Federation (Khanty-Mansiysk Autonomous District, the Kamchatka Territory, Yamalo-Nenets Autonomous District, Chukotka Autonomous District and the Tomsk Region). In these constituent entities of the Russian Federation, it is possible to carry out UAV flights for mail and cargo delivery without excessive regulatory load, as well as to conduct aerial photography, and in the Tomsk region, in addition to that, the use of UAS in agriculture for aerial chemical works is allowed. The duration

[9] URL: http://www.consultant.ru/document/cons_doc_LAW_191538/

[10] URL: https://base.garant.ru/72255560/

[11] URL: https://www.consultant.ru/document/cons_doc_LAW_98957/

[12] URL: http://www.consultant.ru/document/cons_doc_LAW_397613/

[13] URL: http://www.consultant.ru/document/cons_doc_LAW_358738/

[14] Government Resolution of the Russian Federation No. 458 of 24.03.2022 "On Establishing an Experimental Legal Regime in the sphere of Digital Innovation and Approving a Programme for an Experimental Legal Regime in Digital Innovation on the Operation of Unmanned Aerial Systems in the Tomsk Region". URL: http://publication.pravo.gov.ru/Document/View/0001202203260012

[15] Government Resolution of the Russian Federation of 24.03.2022 No. 462 "On the establishment of an experimental legal regime in the field of digital innovation and approval of a programme of experimental legal regime in the field of digital innovation for the operation of unmanned aerial systems in the Kamchatka Territory, Khanty-Mansiysk Autonomous District — Yugra, Chukotka Autonomous District and Yamalo-Nenets Autonomous District". URL: http://publication.pravo.gov.ru/Document/View/0001202203260014

of the ELR in the experimental regions will be three years, after which conclusions will be made and decisions will be taken on the further development of UAS in Russia.

The aforementioned documents have largely closed the regulatory gaps in terms of UAS development, certification, registration, and operation. However, the issues of ensuring the safety of others, regulating the joint use of manned and unmanned aerial systems, protecting privacy and other interests of citizens, regulating, and developing the UAV market and many others remain inadequately regulated [13], although the development of legislation in this direction is among the activities envisaged by the Concept of Integration of Unmanned Aerial Vehicles into a Common Airspace. The existing regulations also need continuous improvement to meet the ever-changing realities of this area of regulation (as an example, during the short period of existence of the Regulation on Accounting for Unmanned Civil Aircraft Vehicles that are subject to accounting, their minimum flight weight has already had to be changed from 0.25 to 0.15 kg).

REGULATORY FRAMEWORK FOR THE CREATION, ACCOUNTING, AND OPERATION OF UNMANNED AERIAL VEHICLES

In the recent history of domestic legislation and state regulation of various spheres of social life, the practice of shaping effective approaches has developed, taking into account the identification and use of relevant experience of foreign countries. However, foreign regulators are now also faced with the need to address the regulatory issues of widespread implementation of UAV systems in various spheres of human activity promptly, as they arise.

When analysing foreign experience in the field in question, it is logical to focus primarily on countries where the implementation of UAS is at a higher level. According to the International Federation of Robotics (IFR) these include China, Japan, Sweden, Italy, Singapore, UK, USA, Canada, Germany, Italy, and France. The study of the practice of regulatory control of the creation, accounting, and operation of UAS in these countries allows us to speak of the possibility to identify a certain pattern that has developed in this area and has been applied in general terms by the domestic regulator as well [19]. First of all, it includes the amendments to the main legal act regulating airspace use, establishing basic general norms concerning UAS (conceptual framework, classification of UAVs, general certification and accounting requirements, basic operating principles). Special issues related to obtaining airworthiness certificates, approval of flight schedules, procedures, and administrative procedures for UAV accounting, etc., are regulated by separate documents (standards, orders, etc.). Provisions set out in such documents are also generally similar to those introduced in the domestic regulatory framework. They include limitations on the altitude and region of UAV flights, determine the minimum take-off weight of vehicles subject to state accounting, contain requirements for the creation and/or certification of UAVs and UAS. There are, of course, some regional and national specifics — for example, UK legislation requires programmatic restrictions of UAV flight areas (near airports, strategic sites, etc.) and Canada has special requirements for UAVs flying where there are people and their pilots (operators) [17].

However, globally, there is a greater variety of approaches to government regulation of the creation (importation), registration and operation of UAS, which can be divided into three groups [13]. The first would include countries where the importation, acquisition, and operation of UAS/UAVs for personal and

commercial use is completely prohibited (Armenia, Turkey, Peru, Vietnam). The second would include those where the use of UAVs is not in fact regulated by the state and can be carried out freely (Iceland, Denmark). Russia, like the above-mentioned countries and many others, belongs to the third and most numerous groups of countries, where the use of UAVs is regulated by the state and is allowed subject to certain requirements for their certification (licensing), accounting and operating procedures. These requirements may be quite liberal (for example, Singapore does not regulate the use of UAVs weighing up to 7 kg), rather strict (in the Philippines and Malaysia, any UAV must be registered, and its operator must have a certificate and license issued after training), or even irrelevant to the problems of UAS use (Morocco, in particular, prohibits the operation of UAVs imported into the country, but allows the use of those purchased in its territory).

Regulators in a number of countries have taken steps not only to regulate the spontaneous situation of UAS/UAV applications, but also to streamline their development process. In the USA, for example, a strategic development document on the use and operation of UAVs until 2038 has been approved, but it is mainly related to their military applications..[16] In the Russian Federation, for its part, the Decree of Government of the Russian Federation No 576-d dated 03.04.2018[17] approved the Action Plan ("roadmap") to improve legislation and remove administrative barriers in order to ensure the implementation of the action plan ("roadmap") of the National Technology Initiative in the direction of "Aeronet". It covers the development of air legislation, including in terms of UAS technologies (which are also included in the National Strategy for the Development of Artificial Intelligence until 2030[18]).

In general, it can be said that the state regulation of the use of UAS, both in Russia and worldwide, is at the very beginning of its formation. At the same time, it is obvious that further technological development will contribute to the increasing expansion of the scope of UAS application, which will require adequate regulatory support based on the use of the best global practices and unification of legislation in terms of applied terminology, as well as approaches to UAV and UAS classification, requirements for their certification and operators (pilots), etc. It should be noted that the problems of using unmanned systems cannot be solved only by introducing the necessary provisions into legislation — this will also require the development, implementation and fine-tuning of mechanisms for their implementation in accordance with the changing realities.

[16] DoD Unmanned Systems Integrated Roadmap FY 2013–2038. URL: https://publicintelligence.net/dod-unmanned-systems-2013/

[17] The Decree of the Government of the Russian Federation No. 576-d of 03.04.2018 "On approval of the action plan ("road map") on improvement of legislation and elimination of administrative barriers in order to ensure implementation of the action plan ("road map") of the National Technological Initiative in the direction of "Aeronet". URL: https://www.consultant.ru/document/cons_doc_LAW_295241/

[18] Presidential Decree of the Russian Federation No. 490 of 10.10.2019 "On the Development of Artificial Intelligence in the Russian Federation" (together with the "National Strategy for the Development of Artificial Intelligence until 2030"). URL: https://www.consultant.ru/document/cons_doc_LAW_335184/

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The Meaning of Russia's Transport and Logistics in Expanding Integration Processes

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ABSTRACT

The paper considers the role and tasks of the transport industry in the economic complex of Russia in the economic sanctions imposed. The analysis of the predicted changes in the international transport and logistics complex allowed the staging recommendations for amendments to the basic policy documents for the industry growth. Also, the paper substantiates the need to adjust certain points in the development of logistics projects within Russia and the Eurasian Economic Union (EEU). The authors analyzed the meaning of railway transport, which is the primary carrier of the considered commodity groups (products of the metallurgical, logging, coal industry) in the new economic conditions. The research proposed the calculation of the projected increase in rail freight traffic in the Siberian Federal District and the Far Eastern Federal District. This assessment is based on the analysis of external exports of the Russian Federation and the Republic of Belarus in the logging, metallurgical, and coal industries in 2020 and a valuation of the sanctions' impact on foreign trade activity.

Keywords: transport and logistics complex; integration processes; EEU; international transport corridors; railway transport

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INTRODUCTION

The progressive development of the Eurasian Economic Union's economic complex depends on the expansion of integration ties within it and the growth of the participants' national economies. The following basic documents and programmes have been adopted to implement the economic strategy in the Russian Federation and the EAEU:

"Strategic Directions for the Development of Eurasian Economic Integration until 2025" (approved by the Supreme Eurasian Economic Council on 11 December 2020).[1]

"On the National Development Goals of the Russian Federation for the period until 2030" (Presidential Decree of the Russian Federation of 21.07.2020).[2]

Achieving these objectives is inextricably linked to the effective development of transport infrastructure. The EAEU is the largest territorial association in the world, and Russia occupies the largest part of its area. Given its unique geographical features, the Union's transport and logistics industry is becoming one of the most important elements of the economic complex and an indicator of its economic condition. Increase of cargo movement speed, decrease of prime cost and cost intensity, increase of throughput capacity, accuracy and safety of delivery, modern logistics services are necessary conditions for competitiveness of the transport industry in international logistics complex. Improvement of the transport and logistics complex of the Russian Federation and other members of the Union and expansion of integration processes in the EAEU depend, among other things, on current global global trends. Given the

[1] URL: https://eec.eaeunion.org/comission/department/dep_razv_integr/strategicheskie-napravleniya-razvitiya.php

[2] URL: http://kremlin.ru/events/president/news/63728

economic changes and forced transformation of the structure of transport flows in the Russian Federation, there is a need to adjust certain articles of the Transport Strategy of the Russian Federation until 2030 and other basic documents of the industry.

The transport industry belongs to the tertiary sector of the economy, but directly forms the conditions for the functioning of the primary and secondary sector and contributes to the multilateral development of regions, industry, trade, tourism and foreign economic relations. According to the World Bank, in 2018 Russia ranked 75th [Logistics Performance Index (LPI) 2.76 points] in terms of logistics industry efficiency and was behind countries of comparable size: the USA in 14th place, Australia in 18th place, Canada in 20th place, China in 26th place, Brazil in 56th place and Kazakhstan in 71st place.[3] The development and modernisation of transport infrastructure affects the final cost of many commodity groups. In the resource industries, logistics costs make up 40–60% of the final price of a product [1]. Changes in the international transport and logistics complex in recent decades have led to evolutionary changes in the industry. The following trends can currently be identified here:

• congestion of classical transport routes caused by a significant increase in international foreign trade turnover (between 2014 and 2018, the increase in foreign trade between the EU and China was 15.2%[4]);

• the modern transport and logistics complex exists in an intensified competition of international logistics projects caused by the growing economic attractiveness of providing transit services and the guaranteed stability of national goods and passenger traffic against the background of the political sanctions against Belarus, Venezuela, Iran, China, Russia, North Korea, Syria, etc. in recent years;

• the emergence of new transport corridors with a unified transport chain, with a synergistic increase in the potential of each of the participants;

• the introduction of modern logistics solutions and innovative methods ("container revolution", "freight villages", high-speed roads and highways, multimodal transport, digitalization, agro-logistics). Geographical expansion in the application of innovative technologies, materials, and advanced equipment. Substitution of classical transport fuels with alternatives — "energy transition" (hydrogen fuel, liquefied petroleum hydrocarbons) as part of the low-carbon climate agenda and the challenge of reducing the cost of transport.[5]

Major transport corridors link the world's leading producers, commodity centres and consumers of goods [2]. With the increasing volume of international traffic, the role of transit logistics entities is increasing. Between 2011 and 2020, rail freight turnover (in billion ton-kilometers) in Russia increased by 26.6%, in China by 9.9%, and in the period from 2011 to 2019 it increased in India by 17.6%, in Germany by 19.7%, in the Netherlands by 12.6% and in Turkey by 30%. Passenger transport by rail (in billion ton-kilometers) between 2011 and 2019 increased in China by 67.9%, in India by 13%, in Germany by 11.4%, in the Netherlands by 18.6% and in Turkey by 101.8%.[6]

The creation of modern transport infrastructure and the application of logistics management methods provide an opportunity to reduce costs, reduce the cost of production of goods, increase transportation volumes, and diversify sales and transit markets. According

[3] URL: https://lpi.worldbank.org/international/global/2018

[4] URL: https://index1520.com/upload/medialibrary/049/_-_3.pdf?ysclid=l2r4tei7zv%20или%20Евростат

[5] Transport innovations. A scientific and technical journal. URL: https://inno-trans.ru/data/documents/IT-43_inet.pdf

[6] Federal State Statistics Service, The Rosstat, https://rosstat.gov.ru/statistics/incomparisons

to the "Transport Innovations" journal of the Ministry of Transport of the Russian Federation, the introduction of innovative digital technologies (operational and technological communication systems — OTC, decentralized communication systems based on VOIP technologies, blockchain technologies) will give tangible results: GDP growth of up to 10%, reduction of transport costs up to 30%, increase in railway transportation volumes by 40% [3, p. 6]. Both major world states and associations (EU, India, China, Russia) and regional leaders (Azerbaijan, Iran, Pakistan, Turkey) are interested in localization and optimization of transport in the Eurasian region. In the Eurasian space, countries simultaneously implement alternative logistics projects [4] at different stages of implementation:

- China — "One Belt, One Road".
- Turkey — "the Istanbul Canal".
- Russia — "the Northern Sea Route", the modernisation of the Trans-Siberian Railway and the Baikal-Amur Mainline.
- India — "the Industrial Corridor".
- Turkey, Georgia, Azerbaijan, Kazakhstan, China — "the Iron Silk Road / the Middle Way".
- Azerbaijan, India, Iran, Russia — "North-South".

With the transformation of the world transport system, in addition to establishing new requirements for its quality [5], it is important to offer an innovative logistics product in a timely manner with the possibility of integration into parallel projects [6], with minimization of economic conflicts with competitive routes.

STRATEGIC POLICY DOCUMENTS OF THE TRANSPORT AND LOGISTICS COMPLEX IN RUSSIA AND THE EAEU

As part of the long-term modelling of the economic and integration policy of the Russian Federation and the EAEU, the following sectoral programmes have been adopted for implementation:

- Transport Strategy of the Russian Federation until 2030 with a forecast for the period until 2035 (approved by the Decree of the Government of the Russian Federation No. 3363-d of 27.11.2021).[7]
- Decision of the Supreme Eurasian Economic Council of 26.12.2016 No. 19 "On the Main Directions and Stages of Implementation, coordinated (agreed upon) by the Transport Policy of the EAEU Member States" and the EAEU Roadmap for 2020–2023 (approved by EFSF (European Financial Stability Facility) Decision of 20.08.2021 No. 15).[8]
- Decree of the Government of the Russian Federation of 10.03.2022 No. 471-d "On Federal Budget for 2022 and for the Planning Period 2023 and 2024".[9]
- National Project "International Cooperation and Export" (Presidium of the Presidential Council for Strategic Development and National Projects of the Russian Federation. Minutes of 24.12.2018).[10]

The programmes have planned organisational measures with a timetable for implementation; funding sources and executors have been identified. The geopolitical events of early 2022 ("Special Military Operation in Ukraine") have led to global changes in the foreign trade relations of Russia, Belarus and, consequently, the EAEU. Russia and Belarus, united by integration ties within the union state, are subject to extensive economic, financial, and political restrictions. The implementation of the declared policy documents from 2022 onwards takes place in a new economic environment. Since February 2022, the West has been tightening the restrictions imposed on various sectors of the

[7] URL: http://static.government.ru/media/files/7enYF2uL5kFZlOOpQhLl0nUT91RjCbeR.pdf

[8] URL: http://www.eurasiancommission.org/ru/act/energetikaiinfr/transport/transportnaya_politika/Pages/default.aspx

[9] URL: http://government.ru/docs/all/139718/

[10] URL: http://government.ru/docs/all/139718/

economic complex of the two countries, which directly affects the transport sector as well. The most significant restrictions have been closed airspace for Russian and Belarusian airlines and aviation in the EU, the United Kingdom, Canada, the United States, etc., a ban on Russian-flagged vessels entering the seaports and inland waters of these countries and on Russian and Belarusian road carriers operating in the territory of the European Union.

The activities and development of the transport sector were indirectly affected by sanctions on Russian exports of certain commodity groups, equipment and technology, restrictions imposed on the financial sector and investments in the Russian and Belarusian economies:

- a ban on coal imports from Russia to the EU (from August 2022), the US, Japan;
- EU, Canada and Japan's refusal to supply Russian timber;
- U, UK and Swiss bans on imports of Russian steel products;
- imposing import quotas on Russian fertilizers and raising the tariff to 35%;
- Import bans from Russia imposed by: Switzerland (goods and technologies used in the military, defence, oil, aviation and space sectors), Singapore (military goods, electronics, computers), the UK (space and aviation technologies, oil refining equipment, catalysts, quantum technologies), Japan (semiconductors, communications equipment and innovative materials, oil refining equipment and technologies), South Korea (semiconductors, chips, microchips, computers), the US (96 Russian companies from the defence, space and maritime sectors have introduced complex licensing procedures to sell goods and technology), the EU (high-tech semiconductors, transport components, quantum computers), Taiwan (57 goods from the high-tech group).[11]

Strategic planning for the industry until 2030 was designed on the basis of models existing until 2021. Changes in Russia's economic and geopolitical international position from February 2022 are a prime example of a "black swan".[12] The programme "Transport Strategy of the Russian Federation to 2030 with a forecast for the period up to 2035" pays much attention to the development of the West-East transport corridor, increasing transit from the Far East, China, India towards Europe through Russia, and Belarus. The planning and proposed budgeting of the roadmap was designed to take into account the significant increase in freight deliveries to the EU. The roadmap did not anticipate a possible significant reduction in Russia's foreign trade with the European Union in 2022 or a significant increase in trade with China, India, and Belarus.

The program "On the Main Directions and Stages of the Coordinated (agreed upon) Transport Policy of the EAEU Member States"[13] stated the step-by-step liberalization of the EAEU logistics services and the development of a coordinated position on the integration of its transport complex into the global transport system as one of the directions. Given the restrictions on road, air, rail and sea transport for Russia and Belarus, and the growing risks for consumers of transit services in the territory of the states, changes in the EAEU industry development model with a shift of the "centre of gravity" to the Asian part is required. Given the expected increase in economic ties with South-West and South Asia, it is necessary to accelerate the processes of expanding integration relations within the EAEU to more widely use and develop the transport and logistics potential of Kazakhstan, Kyrgyzstan, Armenia.

[11] World Trade Organisation. URL: http://government.ru/docs/all/139718/

[12] Term introduced by Taleb N. in 2007 in relation to a hard-to-predict and rare event with significant consequences.

[13] URL: http://www.eurasiancommission.org/ru/act/energetikaiinfr/transport/transportnaya_politika/Pages/default.aspx

Federal Law No. 390-FL of 06.12.2021 "On the Federal Budget for 2022 and the Planning Period of 2023 and 2024"[14] provides for budget appropriations in the sub-section "Road Facilities (Road Funds)" for the implementation of the project "Development of the Federal Highway Network" in the 2022–2024 period to the sum of RUB 46,902,573.00; and RUB 5,845,006.00 (12.46%) for construction, installation and design and survey works in the Northern Federal District and the Far Eastern Federal District of the Russian Federation. In the current situation, it is possible to minimize economic losses by increasing foreign economic relations with East Asian partners. In order to realise this objective, it is necessary to shift budgetary priorities for financing and modernising the transport industry's infrastructure to the eastern federal districts of the Russian Federation.

In accordance with the integrated implementation measures of the "International Trade Logistics" Project, eight roads and two sea border crossing points were planned to be commissioned in the Far Eastern, Northwestern and Siberian Federal Districts in 2022–2023, as well as the introduction of electronic document interchange along international transport corridors. As part of the "International Trade Logistics" Project, the "Transport Services" category (road, rail, water, and air transport) is expected to achieve export figures of USD 25.03 billion in 2024.[15] With significant restrictions on road, air and maritime transport and a possible reduction in transit traffic, it is difficult to achieve the declared foreign trade targets.

[14] URL: http://www.consultant.ru/document/cons_doc_LAW_402647/

[15] Decree No. 471-d of 10.03.22 of the Government of the Russian Federation. URL: http://static.government.ru/media/files/QWc9D20cV0oeXAWPvLNPlA2QDXexouEI.pdf

ANALYSIS OF THE ECONOMIC AND FOREIGN TRADE PARAMETERS OF THE RUSSIAN FEDERATION UNTIL 2022

Russia's exports in 2021 stood at $ 447.54 billion, imports at $ 271.63 billion. For the Russian economy, the leading foreign trade partners in recent years have been the countries listed in *Table 1*.

Of the twelve largest consumers of Russian exports, seven have taken part in economic restrictions, while the six most significant importers have imposed sanctions on the Russian Federation. China's share in Russia's foreign trade turnover has increased due to China's growing demand for mineral resources and the expansion of bilateral economic cooperation between the two countries. Given the change in the vector of supplies from Europe to the Asia-Pacific region, an important task for the transport and logistics complex is to ensure smooth domestic and foreign freight transportation with restructuring the industry's infrastructure in the shortest possible time to increase the capacity of transport routes. In terms of financial and mass-volume indicators, the products of the natural resources sector occupy an important place in the structure of Russian exports (*Table 2*). Despite the decline in indicators, until February 2022 the European Union held a significant share in Russia's foreign trade.

EXPORT STRUCTURAL CHANGES IN THE RUSSIAN FEDERATION IN 2022

Due to the decline in the supply of Russian natural resources to Western countries, a commodity reorientation to Asian, Latin American, and African international markets has become a challenge. When the terms of supply are agreed, the largest strategic consumers of mineral and other commodity groups could be China, Vietnam, India, Indonesia, and Brazil. With a shift in the

Table 1

The principal foreign trade partners of the Russian Federation in 2021

No.	Export		Import	
	Entity. billion USD	billion USD	Entity. billion USD.	billion USD
1	the EU — 28 (the Netherlands — 37.89. Germany –26.66. Italy — 16.64)	166.10	the EU — 28 (Germany — 24.79. France — 11.08. Italy — 10.88. Poland — 5.28)	85.13
2	China	61.64	China	64.46
3	EAEU (Belarus — 23.28. Kyrgyzstan — 18.48)	48.81	EAEU (Belarus — 16.22. Kyrgyzstan — 7.14)	24.41
4	Turkey	22.99	The United Kingdom	15.32
5	The United Kingdom	20.21	The Republic of Korea	11.92
6	UNITED STATES	15.88	Japan	8.29
7	The Republic of Korea	14.57	Turkey	5.87
8	CIS (excluding EAEU countries and Ukraine)	9.68	Vietnam	4.50
9	Japan	9.44	India	4.00
10	India	7.91	UNITED STATES	3.93
11	Ukraine	7.04	Ukraine	3.68
12	Switzerland	3.04	CIS (excluding EAEU countries and Ukraine)	3.00

Sourse: compiled by the authors based on URL: https://eurasiancommission.org

freight turnover of natural resources from the west to the east, the pressure on rail, pipeline and port infrastructure on the Pacific coast is increasing. Pipelines carry 84% of Russia's oil exports across the country, while rail transport — only 13%.[16] Most oil fields are located within the boundaries of the West Siberian Urals Federal District (Khanty-Mansiysk Autonomous District — Yugra and Yamal-Nenets Autonomous District) and are linked by pipeline to the European part of Russia, as well as to the southwest of the Siberian Federal District (Krasnoyarsk Territory, Novosibirsk, Omsk, Tomsk Regions).[17] The main trunk oil pipeline in the Siberian Federal District, the "East Siberia — Pacific Pipeline System" that transports oil from Siberia to its eastern borders, including for export to Asia-Pacific

[16] Pipeline transport: Russia's oil pipelines. URL: https://energosmi.ru/archives/33437

[17] Oil and gas industry news. URL: https://pronpz.ru

Table 2

Exports of certain commodity groups of the Russian Federation in 2021

No.	Commodity group	Total exports. weight. mln tonnes / value. in mln USD	Share of exports to "source of sanctions" countries. in % / EU share
1	Crude oil. including gas condensate	219.47 / 68 952	64.27 / 53.64
	China's share — 34.31%. Turkey's share — 1.17% (Russia's total share of global production in 2019–11. 5%)		
2	Petroleum products/ Oil derivatives	139.21 / 44 299	79.78 / 59.27
	China's share — 4.97%. Turkey's share — 4.97%		
3	Hard coal and lignite	212 713.33 / 12 711	61.49 / 27.01
	China's share — 16.91%. India's share — 4.19%. Vietnam's share — 3.73%. Morocco's share — 2.65%		
4	Unfinished raw timber and longitudinally sawn timber	33.49 / 51	29.06 / 26.87
	China's share — 56.88%		
5	Metals and products made from them	47.65 / 34 900	41.23 / 36.04
	Turkey's share — 10.4%. China's share — 8.5%		
Share of the Russian Federation's exports with third countries in 2021: mineral products — 57.8% (fuel and energy products — 56.1%). metals and metal products — 7.9%. timber — 3.7%			

Sourse: compiled by the authors.

Region countries, with a maximum capacity of 80 million tonnes for 2019.[18] There are 32 oil refineries (refineries) in Russia, with the three in the Siberian Federal District and Far Eastern Federal District: Achinsk, Angarsk and Komsomolsk. In the absence of sufficient capacity, there is no technical possibility to transport most of the oil and oil products previously oriented towards Europe by pipeline infrastructure towards China and far-eastern ports. Large volumes can be transported by rail through the Baikal-Amur Mainline (BAM) and the Trans-Siberian railway, by tanker fleet from the European part of Russia and by rail through Kazakhstan.

Russian rail deliveries to the European Union in 2020 included: raw timber and longitudinally sawn timber — 9.73 million tons, coal, and lignite — 56.54 million tons, crude oil including gas condensate — 117.73 million tons, oil products — 82.50 million tons,[19] ferrous metallurgy and iron and steel products — 9.60 million tons. Belarus' exports to the EU, Canada, and the USA in 2020 were: raw timber, longitudinally sawn timber, fuelwood — 5.66 million tonnes, crude oil, and oil products — 3.25 million tonnes. The Belarusian steel plant JSC "BMZ" shipped 0.925 million tonnes of products to the EU in 2020 which is — 51.40% of total exports.[20] The reorientation of Belarus' export shipments to the east with the help of the Russian transport infrastructure is now inevitable.

The main consumers of coal (China, India. Korea, Taiwan, Japan) have not imposed restrictions on its purchase — in 2020, total imports amounted to 59.47 million tonnes. According to the Eurasian Economic Commission, exports are expected to fall

[18] Transneft. URL: https://vostok.transneft.ru/about/map/

[19] URL: https://eurasiancommission.org

[20] JSC BMZ Sustainable Development Report. URL: https://belsteel.com/doc/social_otchet/sotsialnyiy_otchet_2020.pdf

Table 3

Forecast structural changes in the coal's export industry

No.	Redirected volumes to Asian trading partners. million tonnes (X_1)		Exports: South Korea. Taiwan. Japan. million tonnes (X_3)		Additional traffic on the BAM and Trans-Siberian railway. million tonnes (X)
1	%	Weight	%	Weight	Weight
2	100 (2020)	56.54	100	59.47	56.54
			60	35.68	32.75
			40	23.79	20.86
3	60	33. 92	100	59.47	33.92
			60	35.68	10.14
			40	23.79	–1.76
4	40	22.62	100	59.47	22.62
			60	35.68	–1.17
			40	23.79	–13.07

Sourse: calculated by the authors based on URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/tradestat/tables/Pages/default.aspx

by 56.54 million tonnes in the event of a consolidated practical implementation of the EU countries' ban on Russian coal imports. If cargo deliveries (previously sent to European states) to China, India, Vietnam, Indonesia are coordinated and further exports to Korea, Taiwan and Japan continue, the total volume of cargo transported by BAM (Baikal-Amur Mainline) and the Trans-Siberian Railway will increase.

Judging from the mentioned above, it is necessary to estimate the increase in freight traffic by rail (million tons) in the direction of the Far East regions in 2023–2024. To calculate the projected increase in freight traffic, we will use the formula

$$X = X_1 - (X_2 - X_3), \quad (1)$$

where X — is the additional increment (million tonnes) on the eastern railways;

X_1 — redirected exports (million tonnes) to the east, previously supplied to the EU by Russia and Belarus;

X_2 — exports in 2020 (million tonnes) to Asia, Oceania and North America, which have joined the sanctions against Russia and Belarus;

X_3 — projected exports in 2023–2024 (million tonnes) to Asia, Oceania, North America, countries that have joined the sanctions against Russia and Belarus;

$(X_2 - X_3)$ — projected decrease in the load on the Far East railways due to the reduction of imports of the commodity groups in question, by Asia, Oceania, North America, countries that have joined the sanctions against Russia and Belarus.

In *Tables 3–5* the additional transport-rail load is calculated with the assumption that X_1 and X_3 will amount to 100, 60 and 40% of the 2020 level.

The leading importing countries of timber products that do not participate in the sanctions policy against Russia are China, India, Egypt, South Africa (the share of China in the world import of roundwood is 45%, lumber — 25%). *Table 4* uses formula (1) to

Table 4

Forecast structural changes in the export of the logging industry of the Russian Federation and the Republic of Belarus

Redirected volumes to Asian trading partners (X_1)		Exports: South Korea. Taiwan. Japan (X_3)		Additional traffic through the BAM and Trans-Siberian railway (X)
%	Million tonnes	%	Million tonnes	Million tonnes
100 (2020)	14.94	100	0.58	14.94
		60	0.35	14.71
		40	0.23	14.59
60	8. 97	100	0.58	8.97
		60	0.35	8.73
		40	0.23	8.61
40	5.98	100	0.58	5.98
		60	0.35	5.74
		40	0.23	5.63

Sourse: calculated by the authors based on URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/tradestat/tables/Pages/default.aspx

calculate the predicted structural changes in logging industry exports in Russia and Belarus if exports are redirected to China, India, Egypt, South Africa, South Korea, Taiwan, which have not announced import restrictions on the logging industry, and Japan (which has restricted imports of only unprocessed timber).

Table 5 shows additional exports of ferrous metals by rail to friendly countries in the Far East: China (11.46% of the global total in USD), Vietnam (3.08%), Thailand, Mexico, India, Indonesia, and Malaysia (total share 11.67%). Taiwan, South Korea, and Japan did not join the ban on imports of Russian and Belarusian steel products.

The impact of the economic sanctions imposed on Russia in 2022 on the volume of freight transported via BAM and the Trans-Siberian Railway has been estimated, taking into account the logistical capabilities of the eastern transport routes, in the programme "Modernisation of the Baikal-Amur and Trans-Siberian Railways' Railway Infrastructure and the Development of Traffic and Carrying Capacity (second stage)".[21] The project document stipulates a target of ensuring the carrying capacity of this railway route: 158 million tonnes in 2022, 173 million tonnes in 2023 and 180 million tonnes in 2024.[22] In 2020, the carrying capacity of the BAM and Trans-Siberian Railways reached 144 million tonnes, with 110.40 million tonnes transported to Far East ports; coal exports totalled 100.90 million tonnes (China, India, Vietnam — 53.80 million tonnes; Australia, Korea Republic, USA, Japan — 59.72 million tonnes).[23]

Due to the fact that the main suppliers of timber and coal are the Siberian Federal District and Far Eastern Federal District, (closer geographically to China and the Far East ports) which produce 95.66% of total

[21] Decree of the Government of the Russian Federation of 28.04.2021 No. 1100-d.

[22] URL: http://government.ru/docs/42120/

[23] Russian Railroads. URL: https://company.rzd.ru/ru/9397/page/104069?id=260190

Table 5

Forecast structural changes in the export of ferrous metallurgy goods of the Russian Federation and the Republic of Belarus

Redirected Russian and Belarusian volumes previously supplied to the EU (X_1)		Exports: South Korea. Taiwan. Japan (X_3)		Additional traffic on the BAM and Trans-Siberian railway (X)
%	Million tonnes	%	Million tonnes	Million tonnes
100	9.99	100	6.64	9.99
		60	3.98	7.33
		40	2.66	6.00
60	8. 97	100	6.64	8.97
		60	3.98	6.31
		40	2.66	4.98
40	5.98	100	6.64	5.98
		60	3.98	3.32
		40	2.66	1.99

Sourse: calculated by the authors based on URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/tradestat/tables/Pages/default.aspx, https://belsteel.com/doc/social_otchet/sotsialnyiy_otchet_2020.pdf

coal (hardwood and lignite) and 38.71%[24] of total unprocessed timber, "European volume" export to the Asia-Pacific region is expected to be redirected, keeping exports at 60% of 2020 levels (timber: unprocessed, longitudinally sawn timber, fuel wood, hard coal, and lignite) to South Korea, the Republic of Taiwan, Japan. Such an assumption can be made because of the "redirection" of at least 60% of "European volume exports" of steel products to the Asia-Pacific region and keeping imports by South Korea, the US, the Republic of Taiwan, and Japan at 60% of 2020 levels.

Under the described possible forecast scenario of a change in the direction of Russian and Belarusian exports, the task arises of transporting an additional 53.77 million tonnes of freight by the BAM and Trans-Siberian Mainlines (an additional 34% of the planned throughput capacity in 2022). In order to significantly increase the capacity of the railways within a limited time period of 2–3 years, it is necessary to accelerate the implementation of the declared projects with an increase in funding sources and accelerate the mutual logistical integration within the EAEU.

CONCLUSIONS

The growth of the national economy and foreign trade activities of the Russian Federation depends on the state of the transport and logistics complex. The importance of rail transport, which is the main carrier of the commodity groups in question (products of the metals, timber, oil, and coal industries), is increasing in the new economic environment. Analysis of exports of these commodity groups in 2020 and the sanctions imposed by Western countries on Russia and Belarus helped justify the need to modernise the industry, primarily the trunk lines in the SFD (Siberian Federal District) and FEFD (Far Eastern Federal District) as districts bordering

[24] Federal State Statistics Service, rosstat.gov.ru

the Asia-Pacific region. The proposed calculation of the projected increase in freight traffic of the logging, metallurgical and coal industries in 2023–2024 with changes in the geographical and freight load on the transport network can serve as the basis for revising certain articles of the Transport Strategy of the Russian Federation until 2030.

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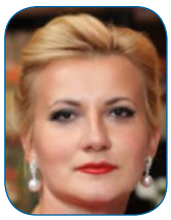

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Russian Financial Market Development Strategic Initiatives Under Sanctions and in the Aftertime

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ABSTRACT

New challenges and restrictions, imposed by a number of countries, affected the Russian financial system and real sector of economy, so implementation of responsive strategic decisions to support financial and real sectors of the economy is necessary. The study's goal is to develop proposals for financial market strategy in new conditions, to support investment opportunities for Russian investors and investors from friendly and neutral countries, to control capital flow in the medium term. The research result is the justification of the new model of the Russian financial system, which is based not only on liberal economic paradigm but also on realities of economic pressure on our country. In the current crisis, it is advisable to have two models of the financial market: the first is based on recognized international principles, which applied to large public Russian companies; the second is focused on companies under sanctions and regional business. Strengthening regulation of cross-border capital movement, including introduction of strict restrictions on capital withdrawal, as well as limits on operations on foreign exchange market, are seen not only as temporary anti-crisis instruments of state regulation, but as the basis for strategy construction for the financial market development. Support of the state development institutions, commercial banks and large corporations of the limited interaction model with developed countries will reduce systemic risks not just in critical periods, but also in the future. Therefore, this can attract resources to real investment projects and stimulate the growth of the capitalization of Russian companies.

Keywords: strategy; financial market; sanctions; capital flow; international financial institutions

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INTRODUCTION

The main objective of the Financial Market Development Strategy of the Russian Federation[1] until 2020 has been to build institutional environment and regulation that increased the attractiveness of the financial market for foreign investors and helped overcome the significant dominance of banks over non-bank financial institutions. This development model was appropriate at a certain historical stage, and was aimed mostly at inflow of foreign investments into the financial market [1]. However, at the same time capital outflow intensified, which was caused by acquiring by Russian residents various assets abroad, including foreign securities, real estate, and allocation of significant part of savings (of the state, corporations, citizens) in foreign currencies and money market instruments of the developed countries.

However, despite the fact that financial market institutions in our country were largely in line with current international requirements, the COVID-19 pandemic required new approaches to economic development. The main challenges of the pandemic led to increased regionalisation processes in the real economy, while central banks' pumping of liquidity into their economies with minimal capital controls led to a fairly rapid recovery of financial markets and rapid growth in capitalisation of post-

[1] URL: https://www.garant.ru/products/ipo/prime/doc/12064654/

industrial companies in developed economies (pharmaceuticals, information technology, digital platforms, etc.).

In effect, the pandemic was the starting point of another historical phase of accelerated concentration of financial resources in developed countries. While significant consumptions concentrated in developed countries, at the same time, much of the material and labor resources as well as manufacturing were being located elsewhere, and logistics and access were becoming more complex.

It can therefore be assumed that the gap between the financial and real sectors of the economy was widening, and that regional imbalances were growing, which required new approaches for improving the efficiency of the reallocation of savings into real investments.

The IMF report noted that funds were channeled into financial markets due to the cheap money policies of the developed world. But these inflows were not so much transformed into investments, but lead to increase in savings, real estate, assets in the global financial market, as well as consumer and food price inflation.[2] Sanctions related to the special military operations in Ukraine have also required from developed countries to take additional measures to support their economies. As a result, the value of certain assets (shares of some companies in the technology, pharmaceutical and military industries) increased. Such growth was not based on fundamental reasons. The economic policy in the US increased the volatility of the financial market, which of course did not contribute to the stability of the world financial system.

Moreover, rising interest rates in developed countries with high levels of debt threaten the global financial system. The ability to issue additional debt is limited. This makes it necessary for a number of countries to look for alternative sources of financing, including the use of foreign resources. This increases the risks for Russian (as well as other many foreign) investors to place their reserves and savings in traditional reserve currencies of developed countries. Based on US Treasury Directive 4 of 28 February 2022, some Russian assets in the US have been frozen through a ban on any transactions with the Bank of Russia, the Russian National Welfare Fund, the Russian Ministry of Finance, and others.[3] The restrictions, which were extended in stages in 2022, were also imposed by the European Commission.[4]

In this context, an important task for our country is to find alternative assets to place state reserves. Such assets could be precious metals, alternative currencies, etc.

It seems that with the onset of the pandemic, or even somewhat earlier, the Russian stock market development strategy aimed exclusively at creating a modern infrastructure and transparent rules for foreign investors in economy of free capital flow has lost relevance, as new global trends have emerged [2]. At this stage, it would be advisable not so much to adjust the strategy of financial market development to adapt it to the periods of crisis, as to fundamentally revise this strategy [1].

An alternative model should, on the one hand, stimulate the inflow of investors'

[2] Fault Lines Widen in the Global Recovery. World Economic Outlook Update. URL: https://www.imf.org/en/Publications/WEO/Issues/2021/07/27/world-economic-outlook-update-july-2021 (accessed on: 03.08.2021).

[3] Directive 4 under Executive order No. 14024 "Prohibitions Related to Transactions Involving the Central Bank of the Russian Federation, the National Wealth Fund of the Russian Federation, and the Ministry of Finance of the Russian Federation". URL: https://home.treasury.gov/policy-issues/financial-sanctions/recent-actions/20220228 (accessed on: 15.08.2022).

[4] Council Regulation (EU) No. 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02014R 0833–20220413 (accessed on: 15.08.2022).

funds — domestic and from neutral and friendly countries — into the Russian financial market and the real economy, and, on the other hand, limit the possibility of capital withdrawal from Russia not only for investors from unfriendly countries, but also from other categories. Finding the optimal model for raising capital domestically and directing it to work in the real economy, as well as limiting capital outflows, is no easy task. Nevertheless, such approaches are already in place, but so far, they are seen as urgent "firefighting" measures. It is thought that much of these instruments should be used in the development of new financial market strategy.

It should be noted that the Bank of Russia has prepared and submitted for public discussion key areas for financial market development in the sanctions' environment.[5] Nevertheless, this draft is rather restrained and does not always correlate with the decisions that the executive authorities and the Bank of Russia are currently adopting and implementing. On the one hand, this conservative approach helps to maintain a positive attitude among market participants, but on the other hand, the Strategy should not be limited to a purely inertial scenario and technical issues without responding (or at least attempting to respond) to the challenges faced by the Russian financial system. This document notes that the financial sector is capable of restoring financial sustainability on its own over the medium term, and that systemic additional capitalisation of the financial sector (including the banking sector) is not required. In fact, it is up to the owners of the credit institutions to support them. For example, market participants are taking various initiatives regarding blocked assets. The Bank of Russia's position is that the option of buying blocked assets from financial institutions is not a solution but will only lead to a massive money issue. While agreeing with this approach in principle, it is still advisable to consider a more flexible one, given some experience of restructuring bad assets through long-term recapitalisation of individual banks, transactions under the Banking Sector Consolidation Fund, as well as funding and advisory support from state development institutions, etc.

[5] The financial market: new challenges in today's environment. A document for public discussion. Bank of Russia. 2022. URL: https://cbr.ru/press/event/?id=14062 (accessed on: 04.08.2022).

NEW STRATEGIC OPPORTUNITIES FOR FINANCIAL INFRASTRUCTURE DEVELOPMENT

When working out the strategy of financial market development in the new conditions, it is important to rely on the approaches formulated in the works of M. Porter on competitive advantages [3], H. Prahalad and G. Hamel on key competences [4], V.L. Kvint on the strategy of cardinal transformations [5], M. Castells on the information society [6], R. Grant on strategic analysis [7], and also develop the ideas of A.D. Nekipelov [8], S. Yu. Glazyev [9], M.G. Deliagin [10], Y.M. Shvirkov [11], Yu.V. Yakovets [12], etc.

The pandemic has exacerbated distortions in the reflection of the real economy's performance in financial indicators. Central banks are focused on supporting liquidity and preventing financial crisis, but building effective boundaries to ensure that liquidity flows into investments and consumptions, rather than spilling over into the financial market and speculation, has so far failed.

However, the liquidity support provided by the central banks of developed countries does not address the lack of tangible assets and long-term resources for development. In this context, some isolation of the Russian economy from unhealthy trends will at some stage allow it to concentrate on solving its own problems, which, paradoxically, complies with the national interest.

High energy prices in recent years and increasing efficiency in the extractive industries have enabled the build-up of reserves and savings. Some of these have been invested domestically (including in the implementation of infrastructure projects), but a significant proportion of reserves and savings has been taken abroad to acquire assets. In addition, the savings of Russian residents and the state in foreign financial instruments (currencies, foreign securities, etc.) also grew.

The difficulty in investing domestically is due to a combination of factors, including the prevalence of short-term savings over long-term savings and the lack of investment opportunities themselves in the country. However, the impact on Russian residents of the Bank of Russia and Sovereign Wealth Fund reserve allocation model, implied investments in foreign jurisdictions, should not be underestimated. A number of investors are willing to invest in projects with a justifiable level of risk (not only in fast-payback projects, but also in the medium term) if there is sustainable demand, including through government procurement or guarantees. Infrastructure in major cities is being modernized, housing construction is growing, etc. However, more complex projects with a long-term perspective and innovative development are often slowed down. In fact, there is a vicious circle: breakthrough projects cannot find long-term financing, because the interests of capital owners are oriented towards quick payback in the short and medium term due to high risks. A parallel should be drawn here with Israel [13], where investors are also focused on short-term projects. The solution could be widening public-private partnerships and the development of new financial platforms.

The financial system development strategy presented by the Bank of Russia,[6] continues to rely heavily on the liberal economic paradigm. In the current environment, a more determined approach is needed to ensure development within a rather closed financial system, relying on an active role of state institutions. While the principle of the Bank of Russia's independence from the executive power was previously supported by most practitioners and experts, in the current situation the Banks of Russia subordination to the Russian government should be considered. Nevertheless, autonomy in the area of monetary policy should be retained.

The imposition of sanctions by a number of developed countries in February 2022 necessitated a fundamental transformation of the Russian financial market. In fact, the trend towards the disintegration of the modern economy has taken hold. The restrictions affected many Russian investors in terms of their foreign investments, as well as foreign investors with assets in the Russian financial system. In particular, a special military operation led to a sharp fall in the value of Russian securities, which was the result of an attempted rush to sell off Russian assets by foreign investors. This fall was exacerbated not only by increased political and economic risks, but also by emotional factors, resulting in the decision to temporarily halt trading on the Moscow Exchange.

Securities trading on the Moscow Exchange has gradually resumed and is demonstrating a positive trend. Thus, the total volume of trade in financial market instruments (shares, corporate bonds, exchange-traded bonds, ownership units, OFZ (federal loan bonds), etc.) on the Moscow Exchange in January 2022 amounted to 37.1 trillion rubles, in July — 41.9 trillion rubles, in October — 46.4 trillion rubles,[7] despite the fact that the total amount of trading in foreign securities and depositary receipts has not been resumed.

[6] The financial market: new challenges in today's environment. URL: https://cbr.ru/press/event/?id=14062 (accessed on: 04.08.2022).

[7] Author's calculations based on data from the Moscow Exchange. URL: https://www.moex.com/s1443 (accessed on: 15.11.2022).

The crisis calls for an expansion of the functions of the economic departments of the executive branch and of central banks. However, whereas previously the principle of independence of central banks was realised, the concept of independence is now being diluted, even at the supranational level. The US Treasury has imposed restrictions on any transactions with the Bank of Russia, the Ministry of Finance, and the National Welfare Fund,[8] effectively blocking government reserves. Similar restrictions have been imposed by the EU and a number of other countries. Thus, at the international level, the Bank of Russia is already perceived as part of the state system. In such circumstances the advisability of preserving the principle of full independence of the Bank of Russia should be determined not by theoretical concepts, but by national interests. Moreover, certain restrictions on the independence of central banks (except for monetary policy) seem logical not only in emergency situations, but also in the medium term. For instance, the People's Bank of China is accountable to the State Council of the People's Republic of China.[9]

The competitive advantage of the Russian financial market until recently was compliance with international requirements in terms of its infrastructure, trading principles, information disclosure, etc., and Moscow Exchange and the National Settlement Depository met the principles for financial market infrastructures developed by BIS Bank for International Settlements and the International Organisation of Securities Commissions (IOSCO).[10] This met the requirements of a qualified intermediary, the US Securities and Exchange Commission (U.S. Securities and Exchange Commission's Rule 17f-7).

Nevertheless, the new situation faced by the Russian economy implies a priority development of the domestic financial market (with reliance on Russian investors, trading on a fully pre-deposited basis, a less complex risk management system, some restrictions on the ability of unqualified investors to invest in foreign financial instruments, etc.). Making it easier for issuers, especially in Russian regions, to enter the market during the crisis implies lower disclosure requirements. Such conditions will attract to the Russian stock market regional companies whose owners preferred not to carry out corporatization and not to bring their organizations to the financial market because of their unwillingness to share power with new shareholders. In addition, such a financial market model is suitable for Russian companies subject to sanctions.

In this context, it seems justified to use two models of financial infrastructure in parallel. The first could be based on generally recognized international principles and target retail investors from Russia and friendly countries, and the main securities could be instruments issued by federal and regional companies that are not under sanctions. The second, simplified model involves less sophisticated risk management and limited disclosure, which is more suitable for qualified investors willing to invest in companies under various restrictions, regional organizations, etc. The parallel existence of the two models is, in fact, still possible, as differentiated requirements for different sections of the Moscow Exchange are allowed. However, to improve the efficiency of the second model, given its focus on regional specifics, we consider it justified to create several exchanges in key regions or at the level of federal districts.

[8] Treasury Prohibits Transactions with Central Bank of Russia and Imposes Sanctions on Key Sources of Russia's Wealth. URL: https://home.treasury.gov/news/press-releases/jy0612

[9] Article 2. Law of the People's Republic of China. URL: http://www.pbc.gov.cn/eportal/fileDir/english/resource/cms/2015/08/2015082610501049304.pdf (accessed on: 17.08.2022).

[10] Principles for financial market infrastructures. URL: https://www.bis.org/cpmi/publ/d101.htm (accessed on: 15.02.2021).

Increasing the number of exchanges, digital financial platforms and other institutions in the Russian financial market is important in the current environment, given that sanctions from Western countries have begun to extend to systemic financial institutions, including National Settlement Depository).[11] But also in the medium term, if two models for the Russian financial market are to be developed, the National Settlement Depository could retain its unique position for the former, while a simplified model should offer greater variability.[12]

At the same time, it is important to continue to develop commodity exchange markets in the regions and Russian price indicators. The Bank of Russia is actively working on this.[13] Domestic prices for many commodity groups follow global prices, but in the new environment of a partially isolated financial market, they may differ between the global and Russian commodity markets due to limited arbitrage opportunities and the lack of working links between commodity exchanges and partner countries.

INITIATIVES TO REDUCE CAPITAL FLIGHT (OUTFLOW)

Restrictions on cross-border capital movements are not only a forced measure due to the current situation, but most likely a belated initiative that should have been implemented years ago. Traditionally, regulation is based on universal principles, while the differentiated approach is used in a limited way. Nevertheless, capital movements should be controlled not only when transactions are linked to offshore jurisdictions, but also depending on the country of origin of the capital, the purpose of its use, etc. In part, this approach is already used in the activities of the sub-commission of the Government Commission for the Control of Foreign Investment in the Russian Federation, where each transaction is considered individually.

In times of crisis, investors, especially non-residents, tend to withdraw capital from emerging markets, which further increases pressure on the national currency exchange rate. In this connection, it is advisable to introduce more flexible regulations and restrictions on non-residents, for example, to close no more than 20–30% of positions during each quarter. In the current crisis situation, severe restrictions have been imposed on capital outflows in response to the freezing of certain Russian assets by a number of countries. However, in the longer term it seems justified to consider capital outflow limits (as a percentage depending on previous investments made) as well as a number of other measures. The regulatory framework laid down in 2022 could be adjusted so that permits for cross-border capital movements are not issued in relation to individual transactions but based on the volume of investment projects implemented over the previous 2–3 years, which would eventually allow for annual limits on the withdrawal of capital for large companies.

The purpose of capital controls is not to prohibit the withdrawal of capital, but to create a transparent system that allows for differentiated limits.

Many economists have long called for restrictions on the cross-border movement of speculative capital [14]. There are various instruments for implementing this initiative, from currency controls to a Tobin tax or

[11] Council Decision (CFSP) 2022/883 of 3 June 2022 amending Decision 2014/145/CFSP concerning restrictive measures in respect of actions undermining or threatening the territorial integrity, sovereignty and independence of Ukraine. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022D 0883 &from=EN (accessed on: 09.05.2022).

[12] The provision of Federal Law No. 39-FL of 22.04.1996 "On the Securities Market" stating that only a central depository may be a nominee holder of securities in the register needs to be clarified.

[13] URL: https://www.moex.com/n49899?ysclid=l70b4rutf2551906644 (accessed on: 01.08.2022).

a tax on non-tradeable foreign exchange transactions.[14] We believe that both administrative and fiscal approaches can be used. For instance, modified Tobin tax may be rather high — up to 2% and be applicable only to currency exchange transactions against reserve currencies, while counter transactions should not be subject to it. It should be understood that financial institutions making transactions on behalf and at the expense of their clients will not be affected by the introduction of this tax. Losses will be incurred by importers and consumers, who will have to pay higher prices for imported goods. However, the reduction of speculative transactions will increase the stability of the national currency and eventually attract long-term investments into the country.

In 2022, capital withdrawal limits were set for non-residents. But more flexible regulation could impose restrictions (varying according to investment characteristics, macroeconomic situation, etc.) on non-resident investors' capital withdrawal, e.g. setting a percentage on the ability to close positions and withdraw capital within one quarter. The aim is to prevent uncontrolled capital flight in times of crisis, not to prohibit capital outflow altogether.

It was noted earlier that trading volumes in the stock market are gradually recovering. But the foreign exchange market is also undergoing transformational changes. Thus, until recently, reserve currencies, including US dollars, euros, etc., accounted for the largest volume of trading on the Moscow Exchange. New external conditions are changing the structure of demand from participants of foreign economic activities: the volume of trade in Chinese yuan, Hong Kong dollar, Belarusian ruble, Kazakh tenge and Turkish lira increased many times. New currencies, including the Armenian dram, South African rand, and Uzbek sum, are being traded.[15]

Government and private savings in toxic currencies are associated with high risks, so there is some potential for investments in gold, precious metals, and soft currencies. Moreover, the export restrictions on Russian gold imposed by a number of countries,[16] will make it possible to increase its share in Russia's foreign exchange reserves more quickly. In this connection, it is advisable to expand state purchases of gold and promote investment in it as a source of savings for Russian residents.

The serious losses suffered by Russian private investors in Q1 2022 and the deprivation of many foreign investors from withdrawing capital suggested that the Russian stock market would stagnate. However, this hypothesis has not been fully confirmed in practice. Investors, especially those working with high leverage, have indeed suffered significant losses and are unlikely to return to the stock market quickly. At the same time, those who have not leveraged and have a balanced portfolio have remained in the stock market, despite the losses, and their activity is gradually recovering. This is to some extent due to the narrowing of investment opportunities and the inaccessibility of foreign securities to Russian retail investors.

It should be noted that the anti-crisis measures taken have calmed the financial market, but some measures were hasty and should not be used as a basis for a new financial architecture. For example, the sanctions imposed on Russian banks and financial infrastructure organisations required the transfer of foreign securities of clients from large SDN-listed banks to other non-sanctioned

[14] Report by S. Y. Glazyev, EEU Minister for Economy and Macroeconomics, "On forecasts of global economic dynamics under the COVID-19 pandemic and possible stabilisation measures within the EEU". URL: https://rcbc.ru/wp-content/uploads/2021/04/2020–04–14_eaes_covid-19–3–12.pdf (accessed on: 10.08.2021).

[15] URL: https://www.moex.com/n48383/?nt=0 (accessed on: 12.07.2022).

[16] Press-release UK sanctions Russian gold exports. URL: https://www.gov.uk/government/news/uk-sanctions-russian-gold-exports (accessed on: 21.08.2022).

Russian companies. Such a move was expected to allow Russian clients of sanctioned banks to continue to conduct transactions with foreign financial instruments and receive income from them. On 18 March 2022, the Board of Directors of the Bank of Russia decided to establish a temporary procedure for transferring securities of foreign issuers by persons in respect of whom foreign states commit unfriendly acts. However, the hastiness of this measure did not protect the interests of investors, who were already suffering high losses. Although it is difficult to speak of the interests of security holders in this situation, decisions made by the regulator should still not destroy investor confidence and market principles, even in such difficult times. In this respect, the transfer of securities on the basis of decisions by sanctioned credit institutions can be seen as an exceptional measure. Centralisation and speedy decisions should not replace private initiative, because it is inherently investors' right to choose the depositary and bank where they prefer to keep their securities and cash, and the brokerage company with which they themselves prefer to cooperate.

One long-term strategic initiative could therefore be connected with the imposition of some limits on the share of foreign securities in retail investors' portfolio. At least in the case of an individual investment account (IIA) for which an individual receives tax deductions, some limits on the share of foreign securities in the entire portfolio seem reasonable. It is important for private investors to understand that in the new environment holding foreign securities is associated with additional risks, although a complete ban on transactions in foreign financial instruments for unqualified investors (proposed in the Concept of the Bank of Russia to Improve the Protection of Retail Investors[17]) seems unnecessary.

[17] Concepts to improve retail investor protection. URL: https://cbr.ru/StaticHtml/File/41186/20220720_concept.pdf (accessed on: 21.08.2022).

The increased risks of operating in foreign jurisdictions affect not only investors but also issuers. The difficulty is that a number of Russian companies, such as Yandex, Tinkoff, Polymetal, X5 Group, VK (formerly Mail Group), etc., have issued and placed securities outside the Russian Federation on behalf of their subsidiaries and therefore are not subject to Russian regulation. As a result, Russian investors holding their shares have, in effect, become dependent on a foreign depository system in which their assets and the proceeds from the securities are locked up. In this context, Russian issuers (and companies set up by them in foreign jurisdictions) should strive to have their securities held in the Russian depository system (tier one) regardless of the country of circulation, with Russian banks acting as paying agents.

ANTI-CRISIS MEASURES AND IMPROVEMENT OF FINANCIAL AND FOREIGN EXCHANGE REGULATIONS

The unprecedented pressure of the sanctions has led to extraordinary solutions in the financial and monetary sphere, which have already proved their worth in the short term. On this basis, we believe it is justified to adapt certain measures for the longer term as well.

Presidential Decree No. 79 of 28 February 2022 "On the application of special economic measures in response to unfriendly actions by the United States of America and associated foreign States and international organizations" established a number of important decisions, including:

- measures of obligatory sale of foreign currency proceeds [residents-participants in foreign economic activities should carry out obligatory sale of foreign currency in the amount of 80% of the amount of foreign currency, credited to their accounts in authorised banks (later, by the Decree of the President of the Russian Federation of

23.05.2022 № 303 this limitation was reduced to 50%, and then — to 0%%[18])];

• prevention of capital flight (prohibition of foreign currency loans by residents, prohibition for residents to transfer money to foreign banks).

Presidential Decree of the Russian Federation No. 81 of 01.05.2022 "On Additional Temporary Economic Measures to Ensure Financial Stability of the Russian Federation" established additional restrictions on transactions with securities and real estate, as well as the granting of loans to non-residents. At the same time, the possibility was given to carry out such transactions on the basis of permits issued by the Government Commission for Control over Foreign Investments in the Russian Federation. A ban was imposed on the export of foreign currency in cash in an amount exceeding USD 10 thousand.

Also, decree No 95 of the President of the Russian Federation of 05.03.2022 "On temporary procedure for the performance of obligations to certain foreign creditors" was adopted, which allows residents to perform their obligations to non-residents in roubles in the amount equivalent to the value of obligations in foreign currency to special accounts of type "C". Securities are similarly credited to "C"-type accounts.

Presidential Decree of the Russian Federation No. 126 of 18.03.2022 "On Additional Temporary Economic Measures for Ensuring Financial Stability of the Russian Federation in the Area of Currency Regulation" grants powers to the Board of Directors of the Bank of Russia to determine the amounts of advance payments to non-residents, defines the powers of the Governmental Commission for Monitoring Foreign Investment in the Russian Federation.

Decree No. 172 of the President of the Russian Federation of 31.03.2022 "On the Special Procedure for Performance of Obligations by Foreign Buyers to Russian Natural Gas Suppliers" allows the use of special rouble and foreign currency "K"-type accounts for gas payments.

Russian Federation Eurobonds special capital flow regulation regime is based on the use of type "I" accounts in accordance with the Russian President's Decree No. 394 "On Temporary Order of Execution to Residents and Foreign Lenders of Russian Federation Government Debts Expressed in Government Securities with Foreign Currency Denomination" dated 22.06.2022. The use of the special treatment allows to settle in priority with Russian holders of Eurobonds [holders of Eurobonds whose holding rights are accounted for by the National Settlement Depository (NSD) or Russian depositories without foreign depositories, the so-called first group, as well as the second group, i.e. holders of Eurobonds whose holding rights are accounted for by Russian depositories with foreign depositories involved] with the remaining funds being transferred to the Type "I" account.[19]

To discharge and fulfill liabilities and obligations towards non-resident holders of Eurobonds of corporate issuers, there is a possibility to use "D" accounts (on the basis of permits issued by the Bank of Russia or the Governmental Commission for Control Over Foreign Investment in the Russian Federation), the legal basis of which is provided by the Presidential Decree of the Russian Federation No. 529 of 08.08.2022 "On Temporary Order

[18] Extract from the minutes of the meeting of the sub-commission of the Government Commission for the Control of Foreign Investment in the Russian Federation of 09.06.2022 No. 61. URL: https://minfin.gov.ru/ru/document/?id_4=136373 (accessed on: 20.08.2022).

[19] On the new procedure for making payments on Russian Federation Eurobonds. URL: https://minfin.gov.ru/ru/press-center/?id_4=37998-o_novom_poryadke_osushchestvleniya_vyplat_po_yevroobligatsiyam_rossiiskoi_federatsii (accessed on: 02.11.2022).

of Performance of obligations under bank account (deposit) agreements denominated in foreign currency and obligations under foreign currency exchange contracts". Also, this Decree allows Russian banks facing blocking of assets in foreign banks to suspend performance of obligations to legal entities with regard to performance of transactions with funds in blocked foreign currencies received in bank accounts of legal entities after this Decree enters into force.

It should be noted that these decisions made it possible to control the use of foreign currency proceeds promptly and to limit capital flight, but some of the restrictions were subsequently adjusted. Decisions taken by the sub-commission of the Government Commission for the Control of Foreign Investment in the Russian Federation could be gradually reoriented from approving individual transactions to setting annual limits on capital movements for large companies and banks. Moreover, in the medium term, decisions on small amounts could be entrusted to large banks, which could issue approvals within the limits set to each bank by the regulator.

The difficulties with foreign trade settlements faced by large Russian companies force them to look for alternative schemes. For example, when making payments to foreign counterparties, Russian companies can use accounts in foreign banks belonging to their foreign subsidiaries. Such a scheme allows payments to be made, including in US dollars and euros, but the assets are not returned to the Russian economy and remain abroad. This further increases the risks from blocking Russian assets in foreign jurisdictions.

Businesses are also trying to resolve issues with the blocking of foreign shares belonging to Russian investors. For example, an Investor Protection Club was formed on the Moscow Exchange, which is a single information space for market participants and is intended to defend investors' interests in the context of sanctions imposed on the National Settlement Depository.[20]

The Bank of Russia is taking important decisions, among which are the following:

- simplification of regulatory requirements for banks and non-credit financial institutions (reflection of equity and debt securities acquired before 18 February 2022 at fair value as of 18 February 2022 in accounting as well as for calculation of a number of Bank of Russia ratios; fixing of creditworthiness ratings assigned by leading rating agencies (Standard & Poor's, Fitch Ratings and Moody's) as of 1 February 2022.;
- use of downgrade coefficients for borrowers subject to sanctions imposed by unfriendly countries; temporary reduction of disclosure by credit institutions);
- temporary restrictions on financial market transactions and income payments (trading on Russian stock exchanges was temporarily suspended and then resumed in stages; a temporary ban for brokers to execute securities sales transactions on behalf of non-residents; a temporary ban on short sales on the Russian financial market (adjusted); a ban for Russian depositories to transfer dividends to non-residents; recommended postponing dividend and management remuneration payments);
- monetary policy and operations to support banks' liquidity (the issuance of cash in foreign currency from deposits has been restricted (the temporary procedure is valid until 9 March 2023); the refinancing rate has been raised to 20% (the rate was subsequently significantly reduced); limits on currency swaps have been increased, and the Lombard (pawnshop) list has been expanded).

An instruction from the Bank of Russia to professional securities market participants engaged in depository and register-keeping

[20] URL: https://www.moex.com/n52269/?nt=106

activities suspended the transfer of payments on securities of Russian issuers to foreign individuals and legal entities.

The Bank of Russia has also recommended limiting the sale of foreign securities to unqualified investors.[21] Such approach seems justified for the current situation, although a complete ban seems unnecessary in the medium term. Some restrictions on the purchase of foreign securities for Russian investors are a measure that could be formulated more flexibly, e.g., placement of funds in foreign financial instruments should not exceed 40% of the total financial market investment portfolio (for each brokerage account), and control over compliance with this requirement should be imposed on professional securities market participants.

The mega-regulator's high adaptability to external changes is a good quality, but the monetary authorities' policy could have been more consistent, aimed at increasing confidence in the Russian rouble and the regulator's decisions.

Overall, the measures taken by both the government and the regulator were broad enough to reduce uncertainty and risk in the Russian financial system. The Presidential Decrees of the Russian Federation aim to prevent certain channels for both Russian and foreign investors to withdraw capital from Russia. Restrictions were introduced for foreign creditors to withdraw assets from the Russian financial system. This approach has relieved panic in the financial market and reduced the negative impact on investors, issuers, and the Russian financial system as a whole. At the same time, these actions were a response to the restrictions imposed by a number of foreign countries on Russian residents to use Russian assets in foreign jurisdictions.

The temporary procedure for Russian residents to fulfil their obligations under loans, borrowings, and financial instruments (including Eurobonds) to foreign creditors from unfriendly countries reduced the outflow of foreign currency. However, difficulties in making foreign currency payments and the effects of anti-crisis measures increased the risks of default by Russian companies, which in a normal scenario would have been unlikely. A number of companies continued to pay their debts in foreign currency after obtaining approvals from the sub-commission of the Government Commission for the Control of Foreign Investment in the Russian Federation.[22] However, despite the performance by Russian companies of their obligations to the extent envisaged by the issue documentation, Russian investors who held their debt through the Eurobonds were unable to receive the funds due to Euroclear, Clearstream and/or payment agents refusing to settle in favour of NSD (National Settlement Depository) and its clients.

To solve this problem, borrowers/issuers of Eurobonds were advised to make payments on them to Russian holders directly, without transferring funds to international settlement and clearing systems. Alternatively, early redemption of Eurobonds from holders with settlement in roubles through the Russian securities market infrastructure was proposed.

The case study shows that issuing companies remain vulnerable to defaults by the financial market infrastructure and that default risks increase significantly in the face of external shocks, not only due to the state of the company itself. In this regard, it is important that the strategy for the development of the Russian financial market includes improvements in the depository and settlement infrastructure. Russian issuers'

[21] Letter of the Bank of Russia No. IN-018–59/94 of 20.07.2022. URL: http://cbr.ru/Crosscut/LawActs/File/5955 (accessed on: 28.07.2022).

[22] This Sub-Commission is authorised to decide on authorisations for residents to carry out transactions with foreign persons of unfriendly states, as well as to carry out foreign exchange transactions.

securities (regardless of where they are held) should be recorded at the basic level by the Russian depository system, and payments should be made by Russian banks. Domestic investors should also seek to hold financial instruments in Russian financial institutions. If they opt for another jurisdiction's record-keeping system, they bear additional risks.

In accordance with Federal Law No. 114-FL of 16.04.2022 "On Amendments to the Federal Law "On Joint-Stock Companies" and Certain Legislative Acts", circulation of depositary receipts for shares of Russian issuers outside the Russian Federation will be terminated, i.e., in fact, we are talking about delisting depositary receipts of Russian issuers placed on foreign stock exchanges. This law is intended to protect Russian issuers and investors from the unlawful actions of foreign clearing and settlement systems in the context of sanctions on the Russian Federation, as well as to increase trading volumes on the Russian stock exchange. It should be noted that issuers still have the option of obtaining permission to continue circulating ADRs on foreign markets.

In the new environment, the Russian financial market must first and foremost serve the national interest and be attractive to Russian private investors. This approach requires the expansion of the number of products, the entry of new issuers (federal, regional, foreign from neutral countries) to the Russian stock exchange, an increase in institutional investors, etc. Active work is under way to improve legislation to develop instruments for long-term savings by individuals, as well as mechanisms to stimulate such savings.

THE NEW ROLE OF INTERNATIONAL FINANCIAL INSTITUTIONS

The special military operation in Ukraine and the extensive sanctions against the Russian economy and its energy sector have led to rising inflation, including in developed countries. In this context, it is expected that many countries will move towards tighter monetary policy, raising interest rates, cutting budget spending and budget deficits. Although the US Federal Reserve has raised the refinancing rate to 3.75–4%,[23] reducing budget spending has not yet become a strategic priority in the US, which reduces the credibility of the US financial system.

It should be noted that easing policies are effective in times of crisis and emergency, but their application must be limited in both volume and duration. The current increase in US interest rates with high debt levels destroys the balance of the US financial system. Moreover, the blocking of dollar reserves by the Bank of Russia is undermining confidence in the dollar and more and more countries are choosing to settle and save in alternative currencies.

It is quite justified that Russia has stopped following blindly the economic decisions of developed countries and is trying to build its own financial strategy. After all, complex challenges require going beyond the standard tools of fiscal and monetary policy. The need for greater synchronisation of monetary and macroeconomic policies implies expanding the functions of the financial regulator in stimulating the economy as well as increasing the central bank's control by the government (in areas unrelated to monetary policy).

The gradual displacement of the US dollar by national currencies in foreign trade in the longer term involves building new supranational financial institutions, expanding the number of reserve currencies, and forming a supranational currency. In this process, it is important to rely on regional groupings such as BRICS (Brazil, Russia, India, China, and South Africa), the EAEU

[23] URL: https://www.federalreserve.gov/monetarypolicy/files/monetary20221102a1.pdf (accessed on: 02.11.2022).

(Eurasian Economic Union) and the SCO (The Shanghai Cooperation Organization), gradually promoting these initiatives at the global level. Nevertheless, the need to reform the world's financial institutions, primarily the World Bank and the IMF, seems increasingly urgent.

The initiative to establish a new world bank, with the ability to independently issue a new world currency, will not be supported at present, above all by the US. Nevertheless, the debt crisis, which will eventually affect many countries, will lead to massive losses, including the depreciation of US dollar reserves. Countries affected by US sanctions and those whose savings in US dollars will therefore be devalued will be able to push for reform of the world's financial institutions.

Advances in information technology are already making it possible to issue a supranational digital currency. Its key advantage over Special Drawing Rights (SDRs) issued by the IMF is that it can be used as a means of payment and savings by a wide range of economic agents, not just states and central banks.

Initially, the new digital currency, like the SDR, may be used by central banks exclusively for reserve purposes, but later its functions may expand (issuing securities denominated in this currency, first by global organisations and national governments, and later by corporations when entering the global capital market). To encourage the use of the currency in international settlements instead of the US dollar and other national currencies, the digital form (digital money) will be optimal. In essence, the advantage of the new digital currency over the dollar is the independence of the supranational issuing centre from the economic policy of states, the impossibility of imposing unilateral sanctions, greater financial stability (initially, the value of the currency can be calculated based on a basket of currencies, gold and other reliable assets) while maintaining oversight to prevent illicit transactions. This currency could gradually displace private cryptocurrencies as well (with a ban on cryptocurrencies at the supranational level). The practical implementation of this initiative is a daunting task, but the increasing systemic risks around the world, the growing probability of default even for sovereign debts of developed countries, give this initiative a more serious consideration.

CONCLUSIONS

External conditions require institutional reforms and a transition to a new strategy for financial market development. Traditionally, hard reserve currencies and gold have always been viewed as reliable reserve assets, but sanctions are changing the way we evaluate savings opportunities by channeling reserves into alternative assets: gold, soft currencies, etc. In the long term, it is advisable to consider the possibility of creating a supranational digital currency that is less subject to sanctions pressure. The most important task that remains is to increase investments, including through the use of mechanisms for citizens to invest in various projects with the participation of state development banks.

The establishment of flexible limits on the withdrawal of capital is aimed not only at reducing its speculative outflow, but also at stimulating domestic investment.

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Forecast of the Digitalization Impact on Public Financial Management

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ABSTRACT

Modern digital technologies based on artificial intelligence and big data have a significant impact on many areas of the socio-economic life of society. At present, digitalization has not affected the public financial management system to a small extent. However, this particular area has a high potential for the use of big data and artificial intelligence, as it is based on significant amounts of information, including unstructured information. At the same time, the process, mechanism and forms of the digital technologies impact on public finance management have been little studied in the scientific literature. The paper forecasts changing in the public financial management system that may occur under the influence of digital technologies in the medium and long term. The authors used a methodical approach based on extrapolation for forecasting. Nowadays, digital technologies have significantly influenced some sectors of the socio-economic people's activity. The forms and mechanisms of such influence had been extrapolated to the public financial management system and, primarily, to various stages of the budget process.

Keywords: artificial intelligence; digital technologies; budgeting process; public finance management; budget planning; budget approval; budget execution; state procurements; new public management

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INTRODUCTION

Digital technology is having a significant impact on people's social and economic conditions: technology is changing (industrial robots are seen as real competitors for jobs), business (internet companies have become global economic leaders), finance (banks have emerged that do not have a single office to serve customers), social connections (they are increasingly moving to the internet). And only one sector is being bypassed by twenty-first century trends — the public finance sector. The budget system of Russia, and other countries, was formed decades ago and continues to live by the canons of the 20th century.

Many problems have accumulated in the budget system that cannot be solved by traditional methods, without extensive use of digital technology and artificial intelligence. Such problems exist at all stages of the budgeting process. At the planning stage for many public-legal entities there is a question of conformity of the budget structure to the structure of citizens' needs, the calculation of which is complicated by the availability of a variety of information, the processing of which is possible only with the use of artificial intelligence tools. In the budget execution process, the biggest problems arise in the public procurement system. Their volume in value terms reached 8.9 trillion rubles in 2020.[1] At the same time, the supervisory and auditing authorities identified more than 83,000 violations of procurement rules worth RUB 362bn. It should be noted that not all government and government-controlled corporate procurements were audited. Every year in Russia, in accordance with the procurement legislation, almost 30 million contracts are signed, which the accounting bodies simply cannot check. This area requires not only the introduction of modern digital technologies, but also building the entire public procurement system based on the principles of artificial intelligence.

Many of the problems in managing public finances are caused by a lack of attention to and transparency of budget data. For example, in 2021, the amount of budget investments was 2,060 billion roubles — which is 60 billion roubles more than in 2020. However, another critical indicator is missing: how much budget investment is needed? Without this, it is impossible to assess the effectiveness of management decisions.

Modern digital technologies can significantly improve the quality of public finance management. It should be noted that the budget system is technologically fully suitable for the introduction of digital technologies and artificial intelligence: there is nothing complicated in budgets, everything is based on four arithmetic operations, but there are huge volumes of information. Its processing is currently fragmented into many disparate blocks (assigned to different people and departments), and only automated systems based on artificial intelligence are able to bring them together. It is most useful in automating dynamic processes that use large volumes of data, including unstructured data. The budget process is fully consistent with this characteristic.

OPEN BUDGETARY DATA

The world is gradually entering an information age of development, characterised by data-driven management.

There have not been many managerial eras in human history. Initially, management was based on physical force. Then it was based on experience, which was accumulated gradually and passed on from generation to

[1] Report on the results of the expert-analytical measure "Monitoring the Development of the Public and Corporate Procurement System in the Russian Federation in 2020". Accounts Chamber of the Russian Federation, 2021. URL: https://ach.gov.ru/upload/iblock/123/442w02xo0vq4unq199jwxnr9mpow972c.pdf (accessed on: 15.12.2021).

generation. Knowledge-based management became decisive with the Industrial Revolution in England. This era continues to this day. However, in many areas of human activity, it is being replaced by data-based management [1, 2]. It is happening most rapidly in technology. Industrial robots, driverless cars, etc. — are the result of digital technology and artificial intelligence. Data-driven active management is spreading in business. Digital technology and artificial intelligence systems have led to the creation of online commerce, online and mobile banking, implementation of enterprise resource management (ERP) systems, etc. Data-driven management is enshrined in modern national standards as one of the principles of quality management.[2]

Information is becoming the most important economic resource. The competitiveness of an economy depends on the ability to generate, process, and effectively use information. Whereas information used to be a cost item, it has now moved to an income item [3]. At the same time, the amount of publicly available data on the Internet is increasing rapidly. G8 leaders adopted the Open Data Charter in 2013.[3] The Open Data Charter, a key provision of which is the recognition that all public data, with the exception of sensitive data, should be open and publicly available by default, i.e., without any additional conditions.

The same applies to information on public finances. In almost all developed countries of the world, large amounts of budget information can be found in the public domain — usually in machine-readable formats. This is a consequence of the open budget policy of many countries and international organisations.

The topic of open budget data has been intensively discussed since the beginning of the 21st century. International organisations have been particularly active: Organisation for Economic Cooperation and Development (OECD), International Monetary Fund (IMF), World Bank Group, Global Initiative for Financial Transparency (GIFT), International Budget Partnership (IBP), etc. The above-mentioned institutions have developed fundamental documents in the area of budget openness.[4]

Let us consider the most common interpretation of budget openness as set out in one of the OECD policy documents.[5] Budget transparency is the timely and systematic full disclosure of all necessary fiscal information. It should ensure that public reporting on public finances is clear, complete, reliable, timely, accessible, and user-friendly, and that citizens can participate in the budget process. The benefits of budget transparency are increased accountability, legitimacy, integrity, inclusiveness, and high quality of budget decisions. All of these should ultimately contribute to building trust between governments and citizens. Thus, the main goal of fiscal openness is usually formulated as increasing the level of trust of citizens in government through its accountability to the public. This position is widespread and is supported by many experts and international organisations [4]. However, some economists note that the link between budget openness and government accountability to the public

[2] GOST R ISO 9000–2015. Quality management systems. Fundamentals and glossary. URL: https://docs.cntd.ru/document/1200124393 (accessed on: 20.12.2021).

[3] G8 Open Data Charter. URL: https://minfin.gov.ru/common/upload/library/2015/06/main/hartiya_otkrytyh_dannyh_gruppy_vosmi.pdf (accessed on: 12.12.2021).

[4] High-Level Principles on Fiscal Transparency, Participation and Accountability. GIFT. URL: https://www.fiscaltransparency.net/ft_principles/ (accessed on: 12.12.2021).

[5] OECD Budget Transparency Toolkit: Practical Steps for Supporting Openness, Integrity and Accountability in Public Financial Management. URL: https://www.oecd-ilibrary.org/docserver/9789264282070-en.pdf?expires=1669038458&id=id&accname=oid022141&checksum=D 997E 686C 7CD 34F133016D 7C 0E 305D 83 (accessed on: 12.12.2021).

is not direct and obvious [5, 6]. This is evidenced by the low popularity of the main tools of the authorities: budgets for citizens and public hearings on budgetary issues, where citizens are passive, which fully suits the authorities [7].

It seems that the point of budget openness is this: budget data provides the basis on which a more modern and efficient system of public financial management will be built. Currently, there are vast amounts of budget data in many countries that are very poorly used. If the tools of artificial intelligence and digital technology were applied to them, the efficiency of the public finance management system would be greatly improved. Many key elements of the system could be reformed, including all stages of the budget process. But before analysing potential innovations in public financial management, it is necessary to consider theoretical and methodological approaches to this issue.

THEORETICAL AND METHODOLOGICAL PREREQUISITES FOR THE DIGITALISATION OF THE BUDGET PROCESS

In recent decades, new scientific interpretations that differ from the classical ones have started to appear in the theory of governance (including public finance). This is, first of all, the concept of New Public Management (NPM), where the most important elements are client-orientation and an emphasis on the efficiency of public administration [8, 9]. Citizens are presented as customers who, in exchange for taxes, should receive services. To this end, they create the state; in the NPM theory, they are hired managers providing services to individuals and businesses.

In this paradigm, one of the most important tasks of public administration seems to be increasing the efficiency of public service delivery with limited resources: increasing the volume or improving the quality of services with a given amount of funding, or reducing the cost of providing services of a given volume and quality. From a practical point of view, it makes sense to compare the effectiveness of services in different sectors, using two abstract parameters: service supply, which describes the effect, and the cost of service, which describes the cost. These abstract parameters can be calculated, at least for social services. It should be noted that the issue of methodology for calculating the efficiency of public services requires a special study and is beyond the scope of this article.

Alternatives to public services need to be considered to make them more effective. For example, medicine can be public, private or insured. Education can be provided in a public, private, charter school or at home. In principle, both health care and school education could be organised without any state funding at all. But street lighting, road construction or maintenance of the army and police require public participation. For efficient service provision, competition is necessary, as it provides the impetus for development. In the public sector, a competitive environment can only be created where services are provided by institutions that are able to compete with each other and with non-state providers.

The New Public Management theory is based on open information, which is seen as the basis for managerial decisions by fiscal actors. The NPM concept has influenced economic policies called “Thatcherism” and “Reaganomics”. It is often criticised in the current economic literature. The main argument is that attempts to implement this theory in practice have not always yielded positive results. As a consequence, other theories of governance began to appear: The Neo-Weberian State (NWS) [10, 11], Digital Era Governance (DEG) [12], New Public Governance (NPG) [13, 14], New Public Service [15], Public Value Management etc. [16–18].

The first three concepts are most widely used.

NWS theory is based on the postulates of M. Weber's "ideal bureaucracy" (Weberian), supplemented by some modern elements, often coinciding with the provisions of NPM. Thus, supporters of NWS try to update the classical theory of bureaucracy to include the principle of customer focus. However, while for NPM it does not matter who provides services to the client, NWS draws a clear distinction between private and public organisations. Priority is clearly given to public service providers. Consequently, the issue of efficiency is secondary, and professional rules for service provision come first. Similar differences exist in the assessment of the role of citizens in public administration. The NPM tends towards direct democracy, the NWS concept focuses on the leadership role of the executive, while recognising the need for public consultation on a wide range of issues.

DEG theory was formed at the beginning of the 21st century. Naturally, it focuses on the use of digital technologies in public administration, especially e-government. However, by criticising the NPM concept, DEG failed to create a coherent methodological platform for public administration reforms and was not widely used in practice.

The concept of social-public (public and state) governance (NPG) has a more serious theoretical basis. It is based on the real existence of the state and civil society. The main task is seen in organising the interaction of these two most important public institutions in decision-making. A necessary element here is the involvement of citizens in public administration, e.g., in the form of public organisations. Efficiency is not supposed to be achieved by rigid methods of competition, but by interaction of civil society with the state, taking into account people's interest in socio-economic development.

Many elements of NPG theory are now being promoted by international organisations such as the World Bank or the International Monetary Fund. This is fully applicable to issues of public financial management, in particular to the problem of budget transparency — in this concept, it implies disclosure by public authorities for reviewing their plans, rather than for making management decisions. Clearly, the theoretical underpinning for fiscal openness discussed above is based precisely on the NPG concept.

When comparing modern concepts of public administration, it should be noted that they differ, among other things, in the degree of motivation to commit reforms in public finance regulation. The NPG assumes soft motivational incentives based on cooperation between the government and society. The NPM is based on hard incentives generated by competition. The latter approach seems to be more adequate to the changes that may be brought about by the widespread adoption of digital technologies and artificial intelligence mechanisms. Firstly, modern technologies often deal with fundamental issues of public finance management, which can far from being solved in an evolutionary way. Secondly, NPM theory focuses on improving governance efficiency. This approach becomes most relevant in times of crisis. Currently, some countries have a complicated situation with their public finances, the main indicator of which is the debt crisis generated by poor management of these finances. Many states spend more money than they earn. However, the growth of debt cannot continue indefinitely. Thirdly, a service orientation makes the most of modern digital technology. It is the services that provide the link to the budget and access to financial and economic indicators, such as cost and cost-effectiveness, necessary for sound management decisions.

Let us consider the main uses of digital technology at various stages of the budgeting process. Note again that these are hypotheses, some of which may not be confirmed or may

not be realised until the distant future.

BUDGET PLANNING

The effectiveness of public finance management depends to a large extent on the quality of budget planning. At present, budget planning is usually carried out by the financial authorities of the executive branch. Whereas ten years ago, only they had the necessary information to do so, today it is publicly available. Any specialist is able to make a forecast of the budget revenues, perhaps more accurately than the financial authority of the public entity. For budget expenditures, there is not yet enough information in the public domain for planning, but based on the rate of budget data availability, it can be expected that in 5–10 years it will be publicly available. All this creates a hypothetical possibility, firstly, of changing the subjects of budget planning and, secondly, of developing alternative, competing draft budgets of public authorities.

The possibility of development of alternative draft budgets to be considered and adopted on a competitive basis is a direct consequence of the trend towards greater openness of the required data. It appears that political parties may be interested in developing draft budgets by involving planners. The drafts will be based on the same data, but will have different approaches in terms of budget policy priorities, budget expenditure structure, attitude to public debt, etc. Competition in this case can improve the quality of planning, as well as encourage developers to use modern digital technology. The executive branch will concentrate on budget execution.

The budget competition system hypothesis is based on data openness, which has reached a high level in many countries. In principle, it is technically possible to establish such a system at present. In practice, however, two obstacles arise. The first is the need for a political decision. Naturally, a system of competitive draft budgets reduces the powers of the executive, and this is always a complex and painful issue. The second is the need to substantially modernise the entire budget legislation, which may take a long time.

APPROVAL OF THE BUDGET

At present, the budget is approved using the mechanisms of representative democracy. But referendums are labour-intensive and costly, so citizens elect their representatives (deputies) and they decide on the budget. This mechanism today has no alternatives, but there is a significant drawback, which has been repeatedly pointed out in the economic literature — deputies do not always express the interests of citizens, often pursuing their own political or economic goals [19, 20]. Recently, more and more researchers believe that representative democracy is in crisis [21, 22].

The rapid development of digital technology allows a different mechanism of budgetary approval. Already today, many citizens have smartphones that recognise their fingerprint. It is possible that other, more advanced methods of identification will soon be available. This makes it possible to hold referendums quickly and cheaply, including on budgetary issues. This practice is a mechanism of direct democracy rather than representative democracy, which also has a significant drawback: Under these conditions, the role of populism, especially in its modern form, dubbed “technopopulism”, is dramatically increasing [23, 24].

It is quite possible that some hybrid budget voting technologies could emerge to reduce the impact of populism. For example, the right to vote could be granted only to those citizens who have been trained on the subject of the budget and confirmed their knowledge in an examination (test). Public financial

management requires at least minimal knowledge, and full accessibility to it must be ensured. Political parties, for example, may be interested in training citizens for free. Thus, if a citizen wishes to participate in budgetary matters, he or she must spend his or her own time on training.

Transition from representative to direct democracy in budgetary decision-making is possible in the medium term but requires much preparation.

BUDGETARY IMPLEMENTATION

Most of the functions performed by federal and regional treasuries are currently automated. However, the level of automation could be increased by artificial intelligence mechanisms. Of greatest relevance is the treasury's activity on preliminary and current control over the conduct of operations with the funds of the budgets of public-law entities. This is a task for the near future.

In banking, the use of artificial intelligence is proceeding at a rapid pace. Some banks, such as Tinkoff, are likely to be IT companies performing banking operations. The consequence of AI is a significant reduction in staff at banking institutions, especially middle-skilled staff. It can be assumed that in a short time treasuries serving budgets will also be downsized and will resemble IT departments in the structure of financial authorities.

A large segment of the economy is public procurement. Every year around the world, public authorities purchase some $ 9.5 trillion USD worth of goods and services from private businesses.[6] In the Russian Federation, public procurement has accounted for about 30% of GDP in recent years.[7] The public procurement system raises many criticisms (including those raised by the Russian Audit Chamber) due to the ambiguity of the conceptual approaches to its formation. The effectiveness of public procurement is often assessed by the level of competition among suppliers of goods and services in tenders. For example, the Audit Chamber of the Russian Federation considers a low level of competition among suppliers to be one of the main reasons for inefficiency of public procurement.[8] Thus, it is considered normal to hold a tender or auction for each procurement in which the supplier offering the best conditions is determined.

A different interpretation is given by GOST R ISO 9000–2015 "Quality management systems. Basic Provisions and Glossary". It recommends that relationships with suppliers should be "based on a balance of short-term benefits and long-term cooperation".[9] The current contractual system clearly prioritises short-term benefits, but it is only in the case of long-term co-operation that the supplier knows the buyer's needs well and adapts to them. The priority of short-term benefits reduces the efficiency of the budget system, but it is largely due to the desire to reduce corruption in procurement.

Artificial intelligence is able to create a system that focuses not only on short-term but also long-term cooperation, while keeping corruption risks to a minimum. By analysing large amounts of unstructured information, it can identify inefficient ones

[6] Why Modern, Fair and Open Public Procurement Systems Matter for the Private Sector in Developing Countries. The World Bank. URL: https://www.worldbank.org/en/news/feature/2018/05/16/why-modern-fair-and-open-public-procurement-systems-matter-for-developing-countries (accessed on: 04.02.2022).

[7] Accounts Chamber of the Russian Federation. Openness of the state in Russia. URL: https://ach.gov.ru/page/government-openness (accessed on: 14.02.2022).

[8] Accounts Chamber of the Russian Federation. Report on the results of the expert and analytical event "Monitoring the Development of the Public and Corporate Procurement System in the Russian Federation for 2018". URL: https://ach.gov.ru/upload/iblock/613/613a1b40adc5ed005bbb804fc17c8db0.pdf (accessed on: 14.12.2021).

[9] GOST R ISO 9000–2015 'Quality management systems. Main provisions and glossary". URL: https://docs.cntd.ru/document/1200124393 (accessed on: 23.10.2021).

even before the procurement announcement stage. The use of artificial intelligence can help to achieve the necessary balance between short-term benefits and long-term cooperation by:

- collecting data on possible suppliers;
- identifying anomalies in tender documents or prices;
- analysing contract performance risks;
- the use of various applications, e.g., chatbots facilitating tender procedures.

The problem of using artificial intelligence in public procurement is well covered in the scientific literature [25]. In some countries, its individual elements are beginning to be introduced in practice.[10]

As a result, it can be predicted that as the use of artificial intelligence tools in OTC ("over-the-counter") public procurement increases, there will be a gradual shift from competitive sourcing to long-term contracts.

MONITORING AND REPORTING

The control bodies (control and audit chambers) today cannot cope with the amount of information that makes sense to check, and identify violations that have already been committed — those that cannot always be corrected. This is one of the areas where the use of artificial intelligence is most appropriate and can have a significant effect. Moreover, work in this area has been ongoing for several years [26].

Artificial intelligence is capable of taking over the control over the targeted and efficient use of budgetary funds and many other functions performed by control and accounting bodies. At that, the audit could be carried out on a continuous basis, not once in several years, as it happens today. In addition, artificial intelligence would be able not only to audit budget execution reports, but also to generate most of them. This would allow these bodies to concentrate on methodological issues.

FLEXIBLE TAXATION SYSTEM

In any country's tax system, there are problematic aspects associated with the desire to minimise taxes by economic actors. This includes the most developed countries. For example, as a result of misreporting, Great Britain underreceives 6% of taxes, and every third taxpayer who files a tax return understates his/her income [27]. However, it is believed that the tax evasion situation in the UK is much better than in other developed countries such as the US or Canada. There is no doubt that digital technology and artificial intelligence can improve the control of tax collection, which is already being used in global practice.

The motivation of taxpayers is of great importance in the tax system. These issues have been studied in some detail, including the observation that the higher the level of citizen involvement in public administration, the lower the degree of tax evasion [28]. Good quality budget automation and the use of artificial intelligence tools increase taxpayer involvement in the management of public finances. This can be achieved by allowing citizens to choose for which purposes their taxes are allocated. Potentially, an individual could be given the right to determine where their income tax will be allocated in the planning year: for school education, landscaping, culture, or the environment; to authorities (sectors) or even to institutions (e.g., a specific school).

This way of involving citizens in the budget process could, firstly, improve tax collection (and also increase taxpayers' control over the efficient use of budget funds), and secondly, increase competition among recipients of budget funds for taxpayers' money. This would require them to disclose as much information about their activities as possible, to prove the

[10] URL: https://sievo.com/resources/ai-in-procurement (accessed on: 14.02.2022).

efficient use of funds, and to introduce new advanced technologies.

Therefore, there is the potential to increase the level of democratisation of the tax system in order to manage public finances efficiently. However, the foreseeable mechanism also has the disadvantage of making fiscal equalisation and balancing of budgets much more difficult. Artificial intelligence and automation can solve this problem.

At present, there is some analogue of the system in question. In the Canadian province of Alberta, citizens belonging to Catholic and Protestant denominations have the right to determine the direction of their property taxes, which are used to fund school education.[11] They can direct their tax to the Alberta School Fund, which distributes the budget to the institutions. But there is another option. Catholics, for example, have the right to direct their tax dollars not to the general fund, but specifically to fund Catholic schools. To do so, you simply have to submit an application to your school district. Protestants have a similar right. This system acts as a moral incentive for taxpayers, as the provincial government further equalises the funding of schools and school districts.

CONCLUSIONS

The impact of digital technology, artificial intelligence and data openness on public administration is only just beginning to be studied in economic science. Even in a country as advanced as the UK in its digitalisation of public administration practices, the first attempts to use artificial intelligence are only being made, and so far, in the simplest forms. However, given the dynamics of digitalisation in the business sector of economics, rapid and dramatic changes in public financial management are to be expected.

Two important factors can be noted that accelerate the introduction of artificial intelligence and digital technologies in public finance management. Firstly, it is the availability of modern theoretical and methodological developments of the last decades, such as NPM and others. Secondly, the high level of openness of budget data in many countries.

However, despite the availability of vast amounts of budget information, accounting, tax and statistical data, there is a real challenge in the public sector to ensure the quality and reliability of the data. To address this issue requires the commitment of the authorities and the recipients of budgetary funds to ensure the completeness and accuracy of the information. The current budget system often encourages the manipulation of data in order to give a favourable impression to superiors or voters. Information from different authorities does not always coincide, as they usually compete for limited financial resources to the detriment of cooperation. In addition, management accounting is almost entirely absent from the budgetary sphere, which makes it impossible to assess the effectiveness of the budget and its individual elements. This problem will only increase as digital technology is introduced.

All this shows that improving the budgeting process is an elaborate and complex problem. Artificial intelligence and digital technologies are important tools for improving the efficiency of public finance management.

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Quotas for Catch of Aquatic Biological Resources

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ABSTRACT

The transformation of the system for distributing quotas for the extraction of aquatic biological resources (ABR) in quotas in Russia affects the interests of many parties. The new system of allocation of rights to catch ABR, which provides for quotas for investment, changes the established order in Russia in fisheries, which caused discussions in the industry. Innovations reduced the level of monopolization of industrial fishing, the development of shipbuilding and the ABR processing in Russia's territory. The aim of the study is to identify the structure of interests of economic entities and the population within the framework of the current quota system of ABR catch in Russia on the example of the Far Eastern fishery basin of the country. Being studying the materials for the paper, the authors used methods of scientific analysis and comparison in the research of the regulatory framework and the distribution of total allowable catches. There is an inductive method prevails in the statistical part of the study, and the monographic method allowed to combine the results obtained in the scientific paper. According to the analysis of the detailed structure and short-term dynamics of the allocation of quotas for the catch of ABR in the Far Eastern Federal District (FEFD), the authors found that the current system of distribution of rights does not fit to global trends aimed at reducing the catch of the wild resource, the capacity and number of fishing vessels. Innovations mainly reflect the interests of large fish producers to the detriment of small ones. However, the potential effect of introducing investment quotas is positive, as it ensures intersectoral cooperation. Against the background of unstable external demand for Russian products, this mechanism stimulates reorienting the activities of fishers from foreign markets to domestic ones, from the sale of raw materials to processed products and making added value within the country, including in the FEFD.

Keywords: investment quota; interest; aquatic biological resource; total allowable catch; Far Eastern fishery basin

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INTRODUCTION

In world practice, quotas for the extraction of ABR are one of the tools for regulating their volumes and diversity in natural habitats [1, p. 92]. The volume of quotas is set on the basis of "total allowable catches" (hereinafter referred to as TAC), which characterize the scientifically substantiated annual catch value that corresponds to a long-term strategy for the rational use of ABR stocks.

The main fishing countries use similar quota systems [2–7], but they reflect different interests of the main users of natural resources. The structure of the distribution of ABR production quotas between users indicates the priorities of the state policy in the development of the fishery complex. The main indicators of the distribution of interests are the volume of quotas for the most profitable types of extracted resources.

As the interest of the world community in maintaining the ecological balance in the water areas has increased, a new priority has emerged for the implementation of national policies of the main fishing countries, associated with a reduction in the volume of wild resource catches in territorial waters (200-mile zone) [8]. This trend is the basis for the adoption of a number of political decisions related to the reduction of ABR production quotas, the reduction of the fleet, the relocation of the production center from national waters to areas of foreign countries and the World Ocean, as well as the spread of the practice of production and consumption of aquaculture products, regulation of export-import operations volumes. (see *figure*).

The volume of quotas is an unstable value, depending on the annually set TAC and natural biological cycles of reproduction. However, individual countries have announced significant reductions in quotas for the extraction of wild resource in their own territorial waters (for example, Japan, Norway, and Iceland) without quantitative estimates of the scale.

The main indicator of the fulfillment of the indicated intentions is the reduction of the fishing fleet. In particular, government policies such as:

- redemption by the state of fishing vessels in order to withdraw them from the fishery (USA) [9, p. 682];
- a decrease in investment in the construction of fishing vessels (New Zealand) [10, p. 17; 11, p. 205];
- subsidizing the construction of ships, if their sizes are 1.3 times less than those being utilized (EU) [9, p. 682];
- payment of premiums for the export of large-capacity fishing vessels to other countries that stop operating in territorial waters (EU) [9, p. 682];
- support for the construction and operation of small coastal fishing vessels (Norway) [12, p. 812, 828];
- subsidizing fishing in the waters of foreign states and open areas of the World Ocean — "long-range fishing" (PRC, Japan) [9, p. 683; 13, p. 371]. In particular, the PRC provides government subsidies for fuel, the amount of which is directly proportional to the size of the vessel.

The withdrawal of fishing vessels outside their own territorial waters does not contribute to the overall reduction in fishing capacity. Thus, in 1950–2015, despite the reduction in global catch, the global fishing fleet more than doubled from 1.7 to 3.7 million vessels. Their number in the world may become even greater, as many developing countries continue to increase the capacity and volume of extraction of the wild resource in excess of TAC. [14, p. 12238].

It has also been established that public interests in maintaining ecological balance and biodiversity are contrary to the private interests of fish producers and enterprises of related activities (shipbuilding, fish processing,

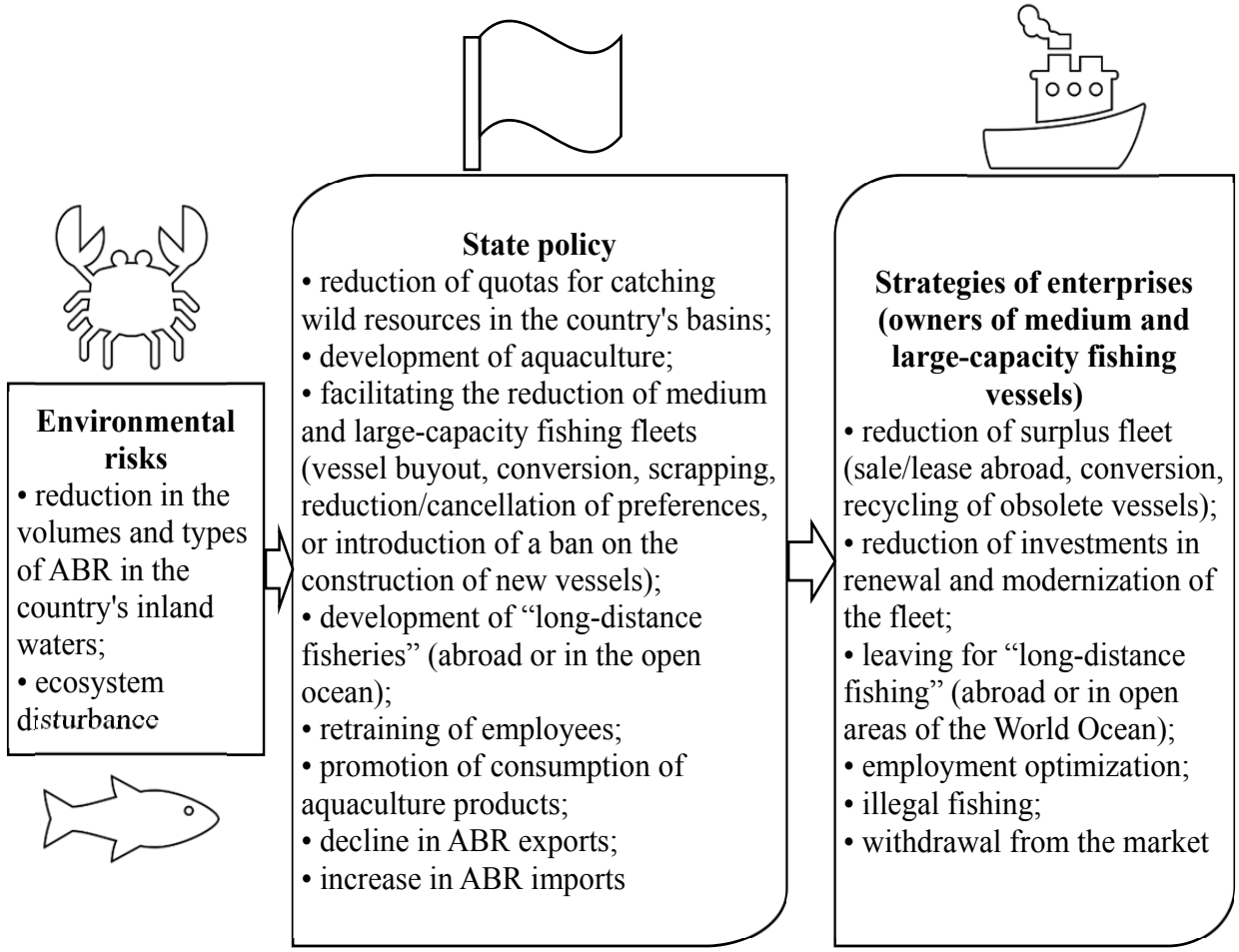

Fig. **Options of a state policy and strategies of fishing enterprises under conditions of environmental risks**

Source: compiled by the authors.

logistics, trade), since in the latter case the focus is on maximizing profits and ABR catch volumes.

Since 1992, the Food and Agriculture Organization of the United Nations has been criticizing the activities of states to provide subsidies and other support measures to fishing shipbuilding, since this leads to an increase in the number and total capacity of ships [15, p. 439]. However, this practice is currently widespread, since a significant part of marine fisheries is unprofitable and needs state subsidies to ensure food security, maintain employment, maintain the traditional lifestyle of the indigenous population, etc. [16, p. 6].

Thus, regulation of ABR catch volumes (changing the quota system, limiting the size of the fishing fleet) affects the interests of a large number of economic entities.

The Russian Federation also uses the ABR catch quota system, which has been in a mobile (changing) state in recent years due to the introduction of new types of quotas and the principles of their allocation.

The basis for the innovations was the criticism of the historical principle of quota distribution, which was a limitation for new players to enter the market and, in accordance with the statements of the FAS Russia and the Federal Agency for Fishery, contributed to the increase in the monopolization of the industry.

Until 2017, the country used the historical principle of distribution of ABR production quotas. In accordance with it, the amount of allowed extraction was set on the basis of the achieved volumes of resource extraction for the previous period. This approach provided preferences to participants that historically demonstrated higher production volumes, and allowed the emergence of new economic entities in the field of industrial fisheries only if there were free shares of quotas. The emergence of free quotas was ensured by an increase in the volume of resources and TAC, or by the refusal of part of the distributed quotas by other participants.

Since 2017, the ABR catch quota system in Russia has been updated with the introduction of new species and quota distribution mechanisms. As a result, the structure of interests in the fishery complex has changed, but, as of April 2022, the new system has not been finalized and is at the testing stage.

Over the past five years, the volumes and diversity of ABR available in the Russian Far East make it possible to catch an average of 3.5 million tons annually (no upward or downward dynamics can be traced). Government agencies do not restrain, but rather, through investment quotas, support an increase in the number of fishing vessels without focusing on their small-tonnage types. There are a number of subsidies and other measures to support industrial fisheries.

In domestic scientific papers, the specifics of the ABR catch quota system and the structure of the interests of the main participants in the fishery complex in Russia in general and in the Far East in particular, are poorly covered. The identified issues are partially addressed in a number of works and characterize the authors' assumptions about the possible consequences of the introduction of investment quotas.

Researchers do not affect the interests of all participants in the fishery complex. M.V. Kruchinin and S.M. Ryzhkova believe that the introduction of crab investment quotas can help reduce investment for those who use historical quotas [17, p. 331] because of the risk of not getting the rights to catch crab in the future. However, new players and investors who are ready to invest in the construction of crab fisheries are interested in these quotas. Yu.A. Levin, A.V. Volkov and V.D. Eremeeva argue that investment quotas are not in demand by small and medium-sized businesses that need a medium- and small-tonnage fleet [18, p. 207]. At the same time, the creation of such vessels is of great importance for the Far East, since it allows the population to be "fixed" on the coast, preserves the environment to a greater extent and reduces the risk of overfishing in the future with a downward trend in TAC. Thus, the interests of small and medium-sized businesses are infringed, while investment quotas are used by new players and enterprises that invest in the construction of large fishing vessels and fish processing plants. Yu.F. Anoshina and T.V. Naumkina believe that the issue of updating the fishing fleet is especially acute for Russia, since its wear and tear is about 80–90%. As a result of the implementation of the investment quota mechanism, it is expected to build more than 100 ships, but about 2.5 thousand need to be replaced. That is, this mechanism will allow only 4% of ships to be updated, which is extremely small [19, p. 105]. In this case, state interests will be satisfied only to a small extent. S.S. Vopilovsky, N.S. Ivanko, S.V. Lisienko and D.O. Sivakov generally positively assesses the changed quota system, expecting the achievement of strategic goals in the development of the fishery complex, since the country's fishing fleet will be significantly updated and become competitive [20, p. 67; 21, p. 254; 22, p. 136], which is in the interests of large fishing enterprises. N.V. Gontar calls investment quotas a reasonable measure due to the lack of direct budgetary costs [23, p. 19], which is important for the state.

In connection with the change in the quota system, domestic researchers did not take into account environmental and a number of state interests. In addition, the authors tried to assess the positive outlook in a generalized way. Thus, the negative facts that appeared at the first stage of approbation of investment quotas were not taken into account, in particular, that ships are equipped mainly with foreign equipment, the balance between processing on board and onshore is not taken into account, the proportions between the number of small, medium large-capacity fishing vessels.

According to the global trend, the quota systems created by the states ensure both private and public interests, smoothing out emerging contradictions, for example, in the field of ecology and environmental protection.

The current experience of ABR catch quotas in the Russian Federation has specific features related to the mechanism for granting quotas in exchange for investments in the construction of fishing vessels and fish processing plants. Thus, the structure of interests has changed, since, within the framework of private benefits, the new quota system provides large orders for a number of domestic shipbuilding enterprises.

The Far East basin accounts for the largest amount of ABR compared to all other water areas of the country. According to the strategy[1] the accelerated development of the fishery complex of the Far Eastern Federal District is based on an increase in the economic efficiency of the development of the main commercial species of ABR. The new quota system may have a significant impact on such areas as production (catch), storage, processing of ABR and the construction of fishing vessels.

[1] Decree of the Government of the Russian Federation dated November 26, 2019 No. 2798-r "On approval of the Strategy for the development of the fishery complex of the Russian Federation for the period up to 2030".

METHODS AND MATERIALS

The study was performed using the methods of synthesis, analysis and comparison based on Rosstat data and regulatory legal acts in the field of fisheries: Federal Law of December 20, 2004 No. 166-FL "On Fishing and Conservation of Aquatic Biological Resources" (hereinafter — Law No. 166-FL); Decree of the Government of the Russian Federation of December 15, 2005 No. 768 "On the distribution of the total allowable catches of aquatic biological resources in relation to the types of quotas for their production (catch)"; Decree of the Government of the Russian Federation dated November 26, 2019 No. 2798-r "On approval of the Strategy for the development of the fishery complex of the Russian Federation for the period up to 2030"; orders of the Federal Agency for Fisheries of the Russian Federation (hereinafter — Rosrybolovstvo/Russian fishery).

RESEARCH RESULTS

1. *Interests in the field of distribution of ABR production quotas have a different focus, depending on their type.*

The number of types of quotas established for fish farmers is unstable. The types of quotas and the mechanism for their provision (administrative procedures) are reflected in the Federal Law No. 166-FL. Currently, 11 types of quotas are available in Russia, which affect the interests of different groups of the fishery complex (*Table 1*).

The study assumes that the quota structure reflects the interests of the following main parties: business entities (users of nature and those operating in related industries) and public organizations that perform regulatory control and oversight functions, as well as external audit in the development of the fishery complex (including state authorities and environmental organisations). Users of natural resources are: the population engaged in amateur fishing and belonging to the indigenous peoples of the Russian

Table 1

Interests of the fishery complex participants in relation to different quotas

<table>
<tr><th>Quotas</th><th>State</th><th>Population</th><th>Environmental organizations</th><th>Fishermen</th><th>Related industries</th></tr>
<tr><td>Historical</td><td>Decrease</td><td rowspan="3">Increase (employment)
Decrease (resource depletion)</td><td rowspan="3">Decrease</td><td>Increase (for old players)</td><td>Increase</td></tr>
<tr><td>Investment</td><td rowspan="2">Increase</td><td rowspan="2">Increase (for new players)</td><td>Increase (raw materials, volume of goods and cargo, ship orders)
Decrease (competition)</td></tr>
<tr><td>Investment crab</td><td>Increase</td></tr>
<tr><td>Scientific</td><td rowspan="2">Maintenance</td><td rowspan="2">–</td><td>Maintenance</td><td rowspan="2">Maintenance</td><td rowspan="2">–</td></tr>
<tr><td>Educational</td><td rowspan="2">Maintenance</td></tr>
<tr><td>Aquaculture</td><td>Increase</td><td>Increase</td><td>Increase</td></tr>
<tr><td>Amateur</td><td rowspan="3">Maintenance</td><td rowspan="2">Increase</td><td rowspan="2">–</td><td rowspan="2">–</td><td rowspan="2">–</td></tr>
<tr><td>For indigenous peoples</td></tr>
<tr><td>In inland waters</td><td rowspan="3">–</td><td rowspan="3">Decrease</td><td rowspan="2">Increase</td><td>Increase</td></tr>
<tr><td>For Russia abroad*</td><td>Increase</td><td rowspan="2">–</td></tr>
<tr><td>For other countries</td><td>Maintenance</td><td>Decrease</td></tr>
</table>

* *Note:* Fishing zones are located outside the territorial waters of the Russian Federation.

Source: compiled by the authors.

Federation (hereinafter referred to as the indigenous peoples/IP); fishing organizations, as well as enterprises of related activities (fish processing, logistics, trade, shipbuilding).

The population is directly interested in quotas for recreational fishing and for indigenous peoples, the rest are of neutral or secondary importance: historical, investment and investment crabs ensure the sustainability of enterprises and employment; scientific — education; for aquaculture, employment, small business development and fresh produce. On the other hand, the capture by large companies of large amounts of the resource can deplete stocks in coastal areas that are traditional fishing areas for indigenous peoples, as well as in places for recreational fishing.

Russian fish producers (small, medium, large businesses)[2] seek to maximize profits by increasing the volume of quotas (historical, investment, in inland waters and abroad).

Due to the peculiarity of the distribution of historical quotas, a group of "old players" has formed, who receive the right to catch a resource based on previously achieved production volumes. Some of these enterprises

[2] There is no information on foreign companies.

are city-forming, on the activity of which the socio-economic development of the respective coastal settlements largely depends.

Investment quotas allow large "new players" who are not able to obtain the right to catch on a historical basis to enter industrial fishing, as well as to increase the share of production for owners of historical quotas.

Enterprises related to fishing industries are interested in increasing the volume of quotas (historical, investment) in order to maximize profits, since there will be more offers for the supply of raw materials and products in the field of processing, logistics and trade. Shipbuilding also benefits, as it forms a portfolio of orders for the manufacture of ships under the "quota in exchange for investment" mechanism. However, fish processors can also gain strong competition by building investment facilities related to ABR processing.

The state, represented by the Federal Antimonopoly Service (hereinafter referred to as the FAS Russia) and the Federal Agency for Fishery, acts as the main regulator in the fishery complex. Changes in the quota system are due to the formation of new priorities aimed at reducing the level of monopolization in fishing, updating the fishing fleet, and developing fish processing. This has been happening since 2020 with the introduction of investment quotas and by reducing the volume of historical ones. Plans to change the size of other types of quotas have not been announced.

Environmental organizations seek to reduce the amount of wild resource catch in order to preserve biodiversity, taking into account natural reproduction cycles and existing threats to the depletion of existing stocks. This applies to fishing quotas in the territorial waters of Russia and abroad. These organizations are interested in increasing quotas for the development of aquaculture and maintaining their volumes for scientific and educational purposes, since this ensures the reproduction of the resource, determines TAC and trains personnel, including in environmental and natural science specialties.

The indicated groups of economic entities of the fishery complex contradict each other in their activities or compete, which inevitably leads to the formation of conflicts of interest. The introduction of investment types of quotas has led to the emergence of new areas of intersection of interests between public organizations and private business, small and large enterprises, "old" and "new" players.

2. *The main center of concentration of interests of Russian fish producers in the field of quota distribution is the Far East basin.*

The size of each type of ABR production quota for economic entities in the Russian Federation is approved annually by the Ministry of Agriculture of the Russian Federation for each fishery basin of the country on the basis of TAC (*Table 2*).

In Russia in 2021, the total volume of quotas amounted to 4284.1 thousand tons, which is 3.9% more than in 2020 (due to an increase in quotas in the Northern Basin and catch in the new zone, outside the country — in Morocco).

The share of quotas that falls on the Far East basin is 69.2%; in 2020–2021, it decreased by 0.5%, i.e. insignificantly (due to the reduction of historical and investment crab quotas).

In accordance with the orders of the Federal Agency for Fishery in the Far East basin for 2020 and 2021, 7 out of 11 types of ABR fishing quotas were distributed (*Table 3*), excluding salmon.[3] In the Far East zones of the basin, no quotas are allocated for:

- educational purposes (perhaps this is due to the lack of applications from scientific and educational organizations of the Far Eastern Federal District);

[3] The distribution of the volume of permitted salmon fishing is carried out at the regional level by special commissions (Article 29.1 of Law No. 166-FL). Information about the results of the work of commissions is not published in the public domain, with the exception of individual cases, on the basis of which it is impossible to form a complete picture.

Table 2

Volumes of quotas for the catch of aquatic bioresources in marine fisheries basins and outside the territorial waters of Russia

Fishery basin	Volume, thousand tons		Change in 2021, %	The share of quotas from the Russian Federation, %	
	2020	2021		2020	2021
Total	4124.90	4284.10	3.9	100	100
Far East	2979.20	2965.00	–0.5	72.2	69.2
Northern	468.4	563.4	20.3	11.4	13.2
Volga-Caspian	23.1	23.1	0	0.6	0.5
Azov-Chernomorsky	0.0002	0.0002	–2.5	0.000005	0.000005
West	84.9	80.4	–5.2	2.1	1.9
Outside the territorial waters of Russia	569.3	652.1	14.5	13.8	15.2

Source: compiled by the authors.

Table 3

Types and volumes of quotas for the catch of aquatic bioresources in the Far East basin

ABR Production quota name	2020		2021		Изменение в 2021
	thousand tons	share, %	thousand tons	share, %	%
Total	2979.2	100	2965.0	100	–0.5
Scientific	1.8	0.1	1.5	0.1	–14.7
Amateur	0.21	0.01	0.24	0.01	16.5
For indigenous peoples	3.7	0.1	3.5	0.1	–4.3
Historical	2875.8	96.5	2833.9	95.6	–1.5
Investment	62.8	2.1	95.9	3.2	52.7
Investment crab	35	1.2	29.9	1	–14.4

Source: compiled by the authors.

- Russian enterprises in foreign water areas (since they are not included in the Far East basin);
- aquaculture.[4]

Also, in open sources there is no information on the size of quotas provided to foreign companies in the exclusive economic zone of Russia, including in the Far East basin.

In the structure of quotas in the Far East in 2020–2021 scientific quotas allocated in the public interest had a constant share of 0.1%, but in absolute terms their size decreased by 14.7%.

Quotas that meet the interests of the population (amateur and for indigenous peoples) also have a total share of 0.1% of the total, but in absolute terms, the decrease was

[4] At the same time, Primorsky Krai is one of the leaders in the country in terms of aquaculture production. Perhaps this discrepancy is explained by the fact that artificial breeding in the region is based on the use of ABR species that are not subject to quotas.

4.3%. The volume of quotas for recreational fishing is 0.01% (in 2021 it increased by 16.5%), for indigenous peoples — 0.1% (decreased by 4.3%). That is, the reduction in the volume of quotas for the population that occurred in 2020–2021 was due to a decrease in TAC for indigenous peoples.

Quotas intended for industrial purposes occupy a dominant position — 99.8% of the total (of which historical — more than 95%); reduction for 2020–2021 was 0.5% — the smallest, compared with the groups discussed above. However, the dynamics in the structure of these quotas is multidirectional: historical and investment crab quotas decreased by 1.5 and 14.4%, while the investment ones increased by 52.7%.

Thus, the increase in investment quotas occurred at the expense of historical and against the background of a decrease in investment crab, as well as other species that have a social and public purpose (for indigenous peoples and scientific). It can be assumed that the decrease in the latter is a consequence of the increase in investment quotas.

3. *More than 50% of quotas for industrial fishing in the Far East basin are distributed in the Sea of Okhotsk zone.*

The Far East basin geographically includes: the Chukhotsk Sea, the Bering Sea, the Okhotsk Sea, Sea of Japan, the waters of the Pacific Ocean adjacent to Eastern Kamchatka and the Kuril Islands with the corresponding basins of the rivers flowing into them.

The Far East basin is divided into 8 commercial zones,[5] washing the coastlines of 6 constituent entities of the Russian Federation in the Far Eastern Federal District (with the exception of the Republics of Buryatia and Sakha (Yakutia), the Trans-Baikal Territory, the Amur and Jewish Autonomous Regions).

The Sea of Okhotsk zone occupies a leading position in terms of most characteristics. It is adjacent to the largest number of regions (Kamchatsky and Khabarovsk Territories, Magadan, and Sakhalin Regions).

The localization of regions along the Sea of Okhotsk zone gives them a nominal territorial advantage in the implementation of fisheries activities, since it is the main fishing center in the Far Eastern Federal District — it concentrates the largest volume of ABR production quotas in the Far East basin (in 2021 — it amounted to 1687.6 thousand tons, or 57%).

The only parameter in which the Sea of Okhotsk zone is inferior to others in certain types of quotas is biodiversity or the number of commercial ABR species.

The Kamchatka Territory and the Sakhalin Region have the greatest advantages due to their proximity to the Sea of Okhotsk zone, as well as to other water areas. Consequently, the economic entities of these regions have the opportunity to satisfy their interests to the greatest extent related to the distribution of ABR catch quotas.

4. *The current priority of changing the quota system in Russia is associated with the development of shipbuilding and fish processing.*

The current state of the fishery complex by 2020 was characterized by a number of problems associated with the aging of fixed assets and their insufficiency. About 70% of the Russian fishing fleet is located in the Far East basin, of which 92% is outside the standard operating life.[6]

The domestic shipbuilding and ship repair industry mainly worked at the expense of military orders. Fishing shipbuilding, as well as ship repair and instrumentation, did not develop for a long time.

[5] Order of the Ministry of Agriculture dated May 23, 2019 No. 267 "On Approval of Fishing Rules for the Far Eastern Fisheries Basin".

[6] Russian Maritime Register of Shipping. URL: https://lk.rs-class.org/regbook/regbookVessel (accessed on: 15.09.2021).

In the context of the degradation of the domestic fishing shipbuilding industry, the renewal of the fleet in Russia in general and in the Far East in particular was mainly due to the acquisition of ships abroad, and most of them had a significant period of use (standard operating life).[7]

The lack of centers for comprehensive maintenance and repair of large fishing fleet vessels in domestic seaports that are competitive in terms of time and cost has led to a reorientation of Russian shipowners to their maintenance and repair abroad.[8] Currently, repairs and inter-trip maintenance are carried out in Russian seaports mainly for small and medium-sized fishing vessels, which is insufficient for modern vessels equipped with advanced equipment.

Due to the high concentration of foreign-made equipment, repairs and technical (including warranty) maintenance of ships in the shortest possible time were also more economically and efficiently carried out abroad.

Also in Russia, the practice of "non-entry" vessels (8% of the fleet in the Far Eastern Federal District), which carried out activities without calling at Russian ports and passing through the "customs clearance" procedure, in accordance with the production process or tax avoidance strategy, has spread.

Along with the maintenance of ships and equipment, there was an outflow of income from Russia and, accordingly, the tax base of the industry decreased due to the shift of service centers to the place of their production in foreign countries.

Also, the specificity of the fishery complex in the Far East and in the country as a whole is a high orientation towards the export of raw materials with a weak level of development of internal processing. This led to the transfer of Russian ABR processing centers to other countries (mainly China) and, accordingly, the loss of added value from the sale of finished products.

Thus, in recent years, significant distortions have developed in the fishery complex, requiring significant investments in development. The introduction of investment quotas has created a promising opportunity for organizing relevant industries in Russia at the expense of private capital investments. In the context of the current principle "where we build, we repair there", the construction of ships creates a promising demand for ship repair and instrumentation services [24, p. 222]. Increasing the capacity of the fishing fleet makes it possible to increase production volumes in the internal territorial waters of Russia, as well as outside them, which has a positive effect on the supply of raw materials for processing, obtaining added value for enterprises, employment for the population and the tax base for the budget. Further growth in processing volumes will create a chain of incremental economic effects in related industries, including logistics and trade. That is, the introduction of investment quotas is considered as a source of propulsive growth that ensures the development of related industries and internal cooperation between them, which have existed separately for a long time.

In accordance with the strategy for the development of the fishery complex of the Russian Federation (hereinafter referred to as the Strategy) for the Far East, it is planned to build 14 coastal fish processing plants by the end of 2022 through the mechanism of "quotas in exchange for investments" (long-term plans for a longer period have not been established)

[7] Analytical report "The current state of the fishing and fish transport fleet in the Far East", prepared in accordance with the work plan for scientific and methodological support of the federal autonomous scientific institution "Eastern Center for State Planning" of the Ministry for the Development of the Far East of Russia for 2020 and for the period 2021–2022.

[8] Decree of the Government of the Russian Federation of November 26, 2019 No. 2798-r (as amended on December 17, 2021) "On approval of the Strategy for the development of the fishery complex of the Russian Federation for the period up to 2030".

and by the year 2025[9] — it is planned to build 18 fishing boats and 25 crab-fishing boats. The strategic documents lack details regarding the qualitative characteristics of the renewal of funds, for example, in terms of the size of the new fleet and the capacity of commissioning coastal fish processing plants.

The implementation of strategic guidelines for the development of the industry will make it possible to redistribute historical quotas between their large holders, as well as create a cross-industry effect of growth in the field of shipbuilding, ship repair, processing of fish products, construction, logistics and trade.

As of April 2022, according to the materials of the Federal Agency for Fishery, 8 fishing vessels have been built for Far Eastern companies in Russia[10] and the construction of 6 supertrawlers is expected[11] (total: 14 vessels, of which 13 fishing vessels — 78% of the plan and 1 crab-fishing boat — 4% of the plan) and 9 fish processing plants[12] (64% of the planned volume established by the end of 2022).

The volume of construction of new fishing vessels envisaged in the Strategy is insignificant and will allow upgrading the industry fleet of the Far Eastern Basin by only 7%, i.e. will only partially alleviate the problem of high wear and tear of ships. At the same time, the fishing capacity of the fleet will increase significantly, as the structure of built and ordered vessels for investment purposes is dominated by large and super-large ones.

The lack of regulation on the number, size and power of the created vessels can lead to an increase in the catch of the wild resource, contrary to the existing global trends to reduce it. In this regard, the expansion of the fleet may increase the pressure on the existing resource base and form a conflict field between public and private interests. In the work of I.V. Levskaya, in order to reduce environmental risks, contains a recommendation on the distribution of investment quotas in exchange for the construction of medium-sized vessels [25, p. 98], with the exception of large and extra-large.

The strategic task of creating production facilities for high-quality products of deep processing in Russia and the Far Eastern Federal District is relevant (80% of fish products in Russia are sold after primary processing) [23, p. 18]. Investors are focusing on processing on ships, but this applies to shallow processing and the most profitable species — pollock[13] and herring, the production of which reaches the maximum level [26 p. 188; 27, p. 16; 28, p. 11]. A promising direction in this regard is the creation of coastal facilities, providing for a higher degree of processing and a wide range of products, including the production from non-fish aquatic organisms. The implementation of these projects will ensure the reorientation of activities from the sale of raw materials to processed products and the formation of added value within the country, including in the Far Eastern Federal District, as well as an increase in tax deductions to the budget system and an increase in demand for labor.

As of April 2022, nine plants with a total capacity of 2,378 tons per day have been

[9] The construction of ships has a long cycle of design, production, and commissioning, so the planned timeline is likely to be increased.

[10] 4 large trawlers of project ST-192 ("Vladimir Limanov", "Mechanic Maslak", "Mechanic Sizov" and "Kapitan Vdovichenko"; the customer is Russian Fishery Company LLC, Vladivostok); 3 medium trawler-seiners of the SK-3101R project ("Commander", "Leninets" and "Vasily Kaplyuk"; customer — Fishing collective farm named after V. I. Lenin, Petropavlovsk-Kamchatsky); 1 medium crab fishing-boat project 03141 (Okhotsk; customer — LLC Far East Coast, Khabarovsk).

[11] The customer of all 6 supertrawlers is Russian Fishery Company LLC.

[12] Factories were built on the territory of the Sakhalin Region, Primorsky and Kamchatsky Territories with a total fish processing capacity of 2378 tons per day.

[13] In 2020 and 2021 the total volume of investment quotas for pollock fishing amounted to 79% (orders of the Federal Agency for Fishery No. 686 dated December 13, 2019 and No. 704 dated December 18, 2020).

put into operation in the Far East on the territory of the Sakhalin Region, Primorsky and Kamchatka Territories. Since the volumes of the current and future needs for the development of processing capacities in the Far East and in the country as a whole are not indicated in the strategic documents, it is difficult to assess the contribution of new construction to the development of the complex. However, it is known that the need for port refrigeration capacities is up to 800 thousand tons of ABR at a time during the peak period. Accordingly, the constructed plants are able to process only 0.3% of the indicated volumes during periods of the highest loads.

Comparison of the constructed processing capacities with the existing shortage of refrigeration equipment is not accidental. During the season in the ports of the Far East, only 20% of ABR can be placed in low-temperature warehouses at a time for further processing and sale. The bulk of the products are sent at reduced prices to other markets, primarily foreign ones.

The need to expand refrigeration capacities in the Far East existed before, however, given the dominance of export supplies and the weak level of development of local processing, this was not a limitation for the industry. In the conditions of instability of external demand for Russian ABR in the Far Eastern Federal District, a commodity surplus of perishable products is formed. In connection with the ongoing changes and with the appearance of incentives for the development of processing in Russia (the introduction of investment quotas), the domestic fishery business (producers and processors) became interested in organizing conditions for the storage, processing and transportation of products in Russia. Therefore, with the introduction of new quotas, there was an interest associated with the development of the internal infrastructure of the entire fishery complex. However, the current wording of the investment quota distribution mechanisms does not support the implementation of such projects. In addition, in the state program for the development of the fishery complex of the Russian Federation, there are no measures for their creation / modernization in the Far Eastern Federal District.

The increase in the number of refrigeration capacities will allow fish producers to ensure the storage of stocks for a longer period, increase the volume of sales of products to the domestic market, increase revenues from the sale of whole products or with minimal processing at a stable, not reduced price during the fishing season. Processors will be able to establish stable year-round supplies of freshly frozen raw materials.

Thus, the introduction of a new type of quota marked new interests and guidelines for the development of the fishery complex of the Far Eastern Federal District. In general, the potential effect is positive, but not optimal, since it is not guaranteed that conditions for all participants will not worsen. Infringement of the interests of small users, as well as the expansion of wild resource extraction, can lead to significant social and public risks. In this regard, the mechanism for their provision needs significant improvement, related to the observance of the rights of not only large, but also small players, and minimization of negative social and public effects. In particular, when adjusting the allocation of ABR production quotas, it is advisable:

- to provide for a mechanism for the priority construction of medium-sized ships to replace those with an excess service life;
- to allocate proportional volumes of permitted catch for small users within the distribution of both historical and investment quotas;
- to create preferential conditions for investment in onshore ABR deep processing facilities, including species that are currently low-margin processing but have potential for payback and increased profitability;

• to take into account the possibility of building port refrigerated warehouses as investment objects.

CONCLUSIONS

Information on the distribution of quotas for the extraction of ABR in Russia in the public domain is incomplete — there is no data on granting rights to catch a wild resource for foreign companies in the fishery waters of the Russian Federation. In the presented study, the analysis was performed on the basis of open data, taking into account the interests of economic entities — the residents of Russia, but the participants in the fishing business from other countries were not taken into account.

The center of concentration of interests in the distribution of ABR production quotas in Russia is located in the Far Eastern Federal District (70% of Russia's TAC), primarily in the Sea of Okhotsk zone.

In recent years, there was only a slight change in ABR quotas, despite global trends associated with measures taken to reduce the catch of wild ABR. In the Far East and in the country as a whole, the focus on catching a wild resource remains. The insignificance of the volume of quotas for the development of aquaculture is due to the poor development of this area of activity.

Despite the introduction of new types of quotas, the transformation of the general system of their distribution has not taken place. The share of new types of quotas related to the implementation of investment projects is insignificant (less than 5%), the bulk (more than 95%) is still distributed according to the historical principle.

The principle of quotas in the Far East Basin reflects to varying degrees the interests of the participants — the state, the population, environmental organizations, fish producers, enterprises of related industries (processing, logistics, trade, shipbuilding, etc.).

The interests of a socially significant group — (population) are taken into account to the least extent in the current system of distribution of quotas. In recent years, their volume has decreased against the backdrop of an increase in investment quotas that are beneficial for large fishing enterprises and holdings — players capable of investing significant funds in the construction of ships and factories.

Small market participants, including communities of indigenous peoples, cannot compete with large investors, and, accordingly, do not have the opportunity to obtain a new type of quota. Due to the fact that investment quotas are formed at the expense of historical volumes, small industry players are deprived not only of potential investment quotas, but also of part of their historical quotas.

The absence of a mechanism for fixing the share of small business entities in the structure of investment quotas can lead to further infringement of their interests and deterioration of the socio-economic situation in small coastal settlements and places of compact residence of indigenous peoples.

The development of the fishing fleet in exchange for quotas is currently carried out through the construction of mainly large and large vessels, while the renewal of medium-sized vessels is taking place to a lesser extent. This means that the capacity for the extraction of the wild resource increases with a negligible level of fleet renewal.

The shortage of port refrigeration capacities can become a significant limitation for the development of the industry, including in the area of reorientation of activities from foreign markets to domestic ones. Currently, the rules for granting quotas in exchange for investment do not consider the creation of refrigeration facilities as an investment object. The distribution of quotas in exchange for the creation of port

refrigeration facilities would remove the existing restriction on the development of the industry.

In the context of the instability of external demand for products of the fishery complex, the interest of economic entities in reorienting activities from the external market to the domestic one, as well as from the export of raw materials to the supply of finished products, including to domestic markets, has formed. In this process, investment quotas have become an additional incentive for fish producers and enterprises in related industries.

Innovations in the quota system are being tested. In order not to infringe on the interests of small users, the mechanism for providing quotas needs to be adjusted. That is, it is necessary to allocate for them proportional volumes of permitted catch within the framework of the distribution of both historical and investment quotas.

Thus, the study revealed the following:

- interests in the area of distribution of ABR production quotas have different directions depending on their type;
- the main center of concentration of interests of Russian fish producers in the area of quota distribution is the Far East basin;
- more than 50% of quotas for industrial fishing in the Far East basin are distributed in the Sea of Okhotsk zone;
- the current priority of changing the quota system in Russia is associated with the development of shipbuilding and fish processing.

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