



# SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

Proceedings of the  
International Conference

Date:  
April 10

Beijing, China 2024



上合组织国家的科学研究：协同和一体化  
国际会议

参与者的英文报告

International Conference  
“Scientific research of the SCO  
countries: synergy and integration”

Part 4

2024 年 4 月 10 日。中国北京  
April 10, 2024. Beijing, PRC

Proceedings of the International Conference  
**“Scientific research of the SCO countries: synergy  
and integration”** - Reports in English

(April 10, 2024. Beijing, PRC)

ISBN 978-5-905695-82-7

这些会议文结合了会议的材料 – 研究论文和科学工作者的论文报告。它考察了职业化人格的技术和社会学问题。一些文章涉及人格职业化研究问题的理论和方法论方法和原则。

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ISBN 978-5-905695-82-7

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DOI 10.34660/INF.2024.25.81.006

共同价值观理论概念的协同背景  
**SYNERGIC CONTEXT OF THE CONCEPT THE THEORY OF  
COMMON VALUES**

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抽象的。共同价值观理论（利益相关者方法）的概念通过“经济人”（*homoeconomicus*）和“社会学人”（*homo sociologies*）科学方法统一的棱镜进行探索和折射，体现在以下假设中：“社会经济文化人”（*homosocial-economic-culture*）理论。提出将利益相关者管理融入包括区域经济系统在内的可持续社会经济生态发展的综合区域战略技术中，可以产生协同效应，实现区域发展战略的目标。

**关键词：**区域、RES、可持续发展、以人为本、区域战略、利益相关者方法、“经济人”（*homoeconomicus*）、“社会学人”（*homosociological*）、“社会经济文化人”（*homoeconomicus*）的科学方法（社会-经济-文化）、战略发展、协同效应。

**Abstract.** *The concept of the theory of common values (stakeholder approach) is explored, refracted through the prism of the unity of the scientific approaches of “economic man” (homo economicus) and “sociological man” (homo sociologies), embodied in the postulates of the theory of “socio-economic-cultural man” (homo socio-economic-cultural). The idea is advanced that integrating stakeholder management into the technology of integrated regional strategizing for sustainable socio-economic-ecological development, including regional economic systems, can provide a synergistic effect and achieve the goals of regional development strategies.*

**Keywords:** *region, RES, sustainable development, human-centrism, regional strategizing, stakeholder approach, scientific approaches of “economic man” (homo economicus), “sociological man” (homo sociological), “socio-economic-cultural man” (homo socio-economic-cultural), strategy development, synergetic effect.*

At the present stage of economic development, the role of the stakeholder approach is increasing as one of the key elements of a closed cycle of strategizing at the level of the region and regional economic systems (RES). A distinctive marker

of the approach is the network nature, or networking, which fits into a systematic approach to strategic regional planning and management, as well as into the active processes of informatization and digitalization of the economy at the post-industrial stage of social development. The term networking connects two English words “net” and “work”, which are translated into Russian as “network” and “work”, or “business network” [1, p. 57]. Its meaning means the establishment of expedient and coordinated relationships between people with similar needs, interests and goals. The features of the processes of informatization and the information society are pointed out by the famous sociologist M. Castells, who draws attention to “... the emergence of knowledge and information as the main source of productivity” [2]. Information and communication technologies, coupled with a stakeholder approach, today act as a powerful driver for the development and promotion of digitalization at the level of state, regional and corporate management structures. The conceptual foundations of the methodological approach of the theory of shared values, the kernels of which were laid in the scientific work of E. Freeman “Strategic Management: The Role of Stakeholders” (1984) and correlated with the concepts of “stakeholders” or “interested parties”, have become the subject of high scientific interest, pushing scientists to study the advantages and imperfections of the dominant liberal market economic model and the need to adapt it to changes in public demands and operating conditions of modern socio-economic systems [3]. The leitmotif and driving incentive of the classical model of a market economy is the selfish interest of the human owner, aimed primarily at permanent and unlimited profit growth, however, different actors of the market process have their own goals and objectives, which are associated not only with material, but also with non-material incentives for work, the desire for intellectual and physical perfection, increasing the level of sociocultural and spiritual development. These features of individuals in a society that has entered the stage of the knowledge economy, active processes of informatization and digitalization, are not properly reflected in the liberal market economic model. The stakeholder approach, which sets the goals of fair and adequate remuneration “for the work” of participants in market relations, should be considered in the context of a socio-economic-ethical person as the crown of the historical evolution of society. Its rational, reasonable application allows us to re-emphasize the traditional market economic model and search for its variant, focused on satisfying the interests of the “socio-economic-cultural person” [4].

The stakeholder approach, along with the concepts of sustainable development of SES, human-centrism, informatization and digitalization of the economy, is becoming increasingly popular not only as a theory, but also as a practice in the functioning of systems at the level of state, regional and corporate management structures. Its use in strategizing processes can provide a synergy effect [5] pro-

vided that social, economic and cultural phenomena are integrated into a single stakeholder network and combined with the progressive strategic imperatives of the “society – economy – ecology” triad. However, there arises the difficult task of applying these phenomena to the interests of individual interest groups and fair compensation for their costs to stakeholders according to their contribution to the activities of the distribution network within the region. The region and the regional economic zones, operating at the mesoeconomic level of the economy, play the role of an integrator of the achievements of corporate management structures, including organizations (companies, firms, enterprises), and at the same time are the foundation for the sustainability of state management structures.

Key groups of stakeholders at the level of management structures of the region and its regional economic zones, played by the state, business and population, include: federal, regional and municipal authorities, large objects of military, social, cultural infrastructure, united in the “state” class; large and medium-sized businesses in the region, TNCs, entrepreneurs-investors, shadow structures (class “business”); households, or consumers, public organizations and the media (class “population”) [6]. It is necessary to identify the requests, needs, interests of all priority groups and build matrices of correspondence of “requests” to the contribution of stakeholders to the overall result of the systems’ activities. Forming an information base for constructing matrices is a separate complex task, the solution of which involves the creation of many different data banks, which, considered together, characterize stakeholders from different aspects. Introducing primary, secondary, external, internal and other interested parties into the field of stakeholder analysis will significantly complicate the task of identifying and selecting the necessary characteristics, and therefore stakeholders, but will create great pre-conditions for making optimal management decisions on this basis, in particular strategic planning and management of sustainable development of the region.

The class of “primary stakeholders” includes the owners and top managers of the system, investors, employees, partners and suppliers who make up its leading potential. The class of “secondary stakeholders” includes the “outer circle”, or stakeholders who are indirectly related to the system, but have significant influence on it. Examples of secondary stakeholders are the media, government officials and law enforcement officials, politicians, trade unionists and activists of various non-profit organizations. Since the region and its distribution zones act as open systems that closely interact with the external environment, it is extremely important to identify “external” and “internal” stakeholders, which are respectively elements of the external and internal environment of the regional system [7].

Internal stakeholders are interested parties directly involved in the functioning of the system, having a high degree of interest in the results of activities, but the interests of their individual representatives may not coincide with each other.

Thus, the owner strives to receive more income, the top manager strives to reduce gross costs, and the ordinary employee strives to increase wages, despite the fact that they are all interested in better results of the system. *External stakeholders* are a class of individuals indirectly associated with the system, but capable of influencing the effectiveness of its functioning. It includes competitors, government management structures, financial institutions, the media, etc.

It is obvious that the elements of these two classes of stakeholders are not mutually exclusive, they overlap because they contain some common elements, such as the media. Their separate consideration involves determining the weight of each stakeholder in the analyzed class in order to eliminate unwanted duplication of elements. However, the stakeholder analysis will not be complete if we do not introduce into it the components of the phenomena of “economic man” (*homo economicus*), “sociological man” (*homo sociological*), “socio-economic-cultural man” (*homo socio-economic-cultural*), which fit into the imperatives of the triad of sustainable development “society economy – ecology” and are at the basis of its methodology. In general, a complex multidimensional, multicriteria and variable problem arises, which involves an iterative algorithm for solving it based on the feedback principle. Its integration into the mechanism of strategic planning for sustainable development of the region and its management at successive stages of development and, especially, implementation of regional strategies can ensure the achievement of the goals of increasing sustainability, provided that a systemic integrative approach is implemented to the use of stakeholder groups according to their characteristics. The methodological foundations of the outlined approach must be consistent with the provisions of the Federal Law “On Strategic Planning in the Russian Federation” [8], which establishes actions to coordinate strategizing processes at the level of state, regional and municipal management structures.

The organic component of the region is its distribution zones, the functioning of which has a significant impact on the social, economic, environmental and informational regional environment. The region’s management structures are developing business strategies that directly or indirectly involve large groups of stakeholders who have different personalities and personal priorities, and the groups belong to different business and social structures. Because of this, their representatives may be focused, for example, on satisfying material, but different from other similar groups of requests. Some of the interested parties may pursue the goal of maximizing profits, others increasing dividends, and others increasing wages. They may also show interest in improving working conditions, expanding training opportunities, achieving career growth, mutually beneficial partnerships, attracting more investment, financial support from the business community, state, regional and municipal authorities. Business groups can strive to increase the loyalty of consumers, partners, suppliers, public organizations, and the media, for

which they carry out activities in the field of corporate social responsibility (CSR), including those related to environmental issues, cultural and ethical ones, related to moral and ethical phenomena of social development and so on. In the context of the issues raised, a special place should be occupied by programs for creating a unified information system for data of stakeholders, transition to the activities of regional systems in the context of digitalization of the economy. Balancing the interests of stakeholders represents a separate scientific and practical task, which involves the subsequent comparison of the goals of stakeholders with the results of their activities. This task can be effectively solved with the use of digital technologies and econometric modeling, the results of which should be applied in the development of strategies and comprehensive programs for the sustainable development of the region, which makes them more reasonable and consistent.

Let's use the concept introduced in the literary source [1, p. 85], which is called the "Efficiency Prism" and by which the authors mean a system that includes five interrelated projections of the effectiveness of the stakeholder approach, or the theory of shared values. Let us consider the main aspects of research that are the focus of the authors' attention, supplementing them with the concept of "homo socio-economic-cultural", which has not yet found proper coverage in the theory of the stakeholder approach. This concept is a kind of connecting link between research vectors in the field of the sustainable development paradigm, strategizing at the regional level, concepts of human-centrism and a human-oriented economy, moving to the stage of the information society and the stage of its digitalization. The joint use of key postulates of these areas of scientific research can create a *synergy effect*, but requires further development of stakeholder management on an interdisciplinary basis. Let us clarify the methodological principles of the Efficiency Pyramid, placing the author's emphasis on their components:

1) consideration of aspects of satisfying the requests, interests and specific needs of stakeholders, requiring answers to the questions: who is included in the problem field of candidates for the role of stakeholders, what are their personal characteristics, what requests they make, material and intangible;

2) determining methods for assessing the contribution of stakeholders to the activities of the regional economic system and answering the questions: what functions should the involved stakeholders perform, what competencies should they have, how to evaluate the contribution of each and all groups to the functioning of the system, how to create a parity compensation basis for their activities;

3) development of a strategy that requires answering the questions: what strategies need to be developed in order to solve the multi-criteria problem of effective strategizing for sustainable regional development with many unknowns, going back to the economic principle of "cost-benefit" from the point of view of stakeholder management;

4) substantiation of the principles and postulates of the paradigm of sustainable development of the region and its distribution zones, the concepts of regional strategizing, human-centrism and stakeholder approach, which need to be studied from the standpoint of an interdisciplinary approach and improved in order to, using them together, bring the developed strategies to the stage of implementation in the activities of systems ;

5) identification of the opportunities that need to be created in order to ensure a closed loop of strategizing the sustainable development of the region and its distribution zones based on the principles of feedback, allowing in practice to obtain a synergistic effect from the integrated implementation of all vectors of scientific research presented in the work in the context of stakeholder management [ 9].

The efficiency pyramid with the five named projections can be developed and supplemented, in particular, by the sixth, which represents the current problem of modeling risks associated with the activities of stakeholders, which has received worthy development in the scientific works of Chinese researchers. In particular, the articles by R. Young [10, 11] and their co-authors discuss the methodology for designing a stakeholder network of risks associated with certain stakeholders, which, as formulated in the work [12], "...in general allows increasing the accuracy of stakeholder analysis and risks, demystify the problems of the impact of social factors" [12, p. 273].

To summarize, it should be stated that the areas of scientific research presented in this work form the core of the mainstream of modern economic thought, have great promising development potential and, at the same time, high complexity in setting and solving problems for their implementation in practice. Creating a solid methodological foundation for the scientific approaches covered in the article requires the formation of high-class information systems built on the basis of reliable, systematically presented and regularly processed databases of state statistical and accounting reporting of economic entities in the region and its distribution zones. They must contain the necessary and sufficient information for the productive formation of sets of indicators, with the help of which a comprehensive quantitative and qualitative assessment of the requests, needs and interests of stakeholders can be obtained, as well as an adequate assessment of their contribution to the results of the systems, which can be achieved through the development of modern technologies for digitalization of the economy [13, 14].

The complex of scientific directions considered can be successfully conceptualized and formalized if specialists from a number of fields of knowledge are involved in its formation, in particular, such as economic theory, management, strategic planning, econometrics, computer science, as well as sociology, psychology, cultural studies, religious studies and etc., which involves the creation of interdisciplinary teams to solve problems of sustainable development of regions and

strategizing processes in them. The mechanism of their action and improvement represents a separate scientific direction of research and can constitute the seventh projection in the Pyramid of Efficiency, the implementation of the postulates of which can provide a synergistic effect of applying the stakeholder approach in collaboration with other scientific approaches and methods of economic research discussed in this work.

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DOI 10.34660/INF.2024.30.27.007

俄中合作：俄罗斯经济安全的前景、挑战和风险  
**RUSSIAN-CHINESE COOPERATION: PROSPECTS, CHALLENGES  
AND RISKS FOR RUSSIA'S ECONOMIC SECURITY**

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注解。 文章对俄中合作的科学著作进行了分析、评价和系统化。 确定了合作伙伴关系的主要方向。 发现了阻碍双边合作长期有效发展的瓶颈和障碍。 明确了俄罗斯经济安全可能面临的风险。 两国进一步互利互动的增长点已经确定。

关键词： 俄中合作、经济安全、风险。

***Annotation.** The article conducts analysis, evaluation and systematization of scientific works on Russian-Chinese cooperation. The main directions of partnership were installed. Bottlenecks and barriers preventing the effective development of bilateral cooperation in the long term were discovered. Possible risks for Russia's economic security were defined. Points of growth for further mutually beneficial interaction between the two countries have been identified.*

***Keywords:** Russian-Chinese cooperation, economic security, risks.*

**Statement of the problem in general terms.** Globalization, which has created the openness of economies around the world, has led not only to interaction and complementarity, but also to interdependence and mutual influence of economically stronger developed countries on developing countries.

Sanctions pressure on the Russian Federation from the collective West led to limited access of the state economy to certain resources, technologies and markets.

At the same time, this also has a positive effect, because The Russian Federation, using the “Russian lever”, began to search for alternative sources and solutions to mitigate the impact of adverse factors on the economy [1].

This situation predetermined a change in the strategic vector of Russian foreign policy towards the Middle East and Asia-Pacific countries, including interaction and cooperation with the People's Republic of China.

The prospects for Russian-Chinese cooperation are the subject of discussion among both Russian and Chinese economists, political scientists, historians, law-

yers and other scientists and practitioners, and are also discussed at the international level by analysts from different countries.

Among Russian scientists studying the problems and prospects of relations between Russia and China, the works of scientists should be highlighted K.V. Babueva, A.N. Zakharova, A.V. Kortunova, I.E. Denisova, G.V. Kondratenko, Y.V. Kulintseva, A.V. Larionova, V.E. Petrovsky, E.I. Safronova and others.

From the Chinese side, we can highlight the works of Feng Yujun, Gao Jixiang, Liu Huaqin, Liu Qian, Ma Bin, Xu Changzhi, Zhao Long, Sheng Shiliang and other reputable and young scientists.

Consideration of various aspects of ensuring the national security of the Russian Federation through the prism of relations and partnership with China is touched upon in the studies of E.V. Goryan, S.A. Gusarova, S.G. Luzyanina, A.B. Pertsev and many other researchers.

The topic of Russian-Chinese cooperation and their mutual influence on the economy has been the object of study by Western and European experts for many years, such as Lo B. (2008), Kotkin S., Freire MR, Mendes CA (2009), Umbach F. (2004), Aris S. (2016), etc.

Despite the sufficient coverage of the issues under study, changes in the economic and political situation and a change in the course of Russia's foreign economic policy have led to a new round of interaction with China, which indicates the advisability of further consideration of the prospects for cooperation, as well as challenges and risks for the economic security of the Russian Federation.

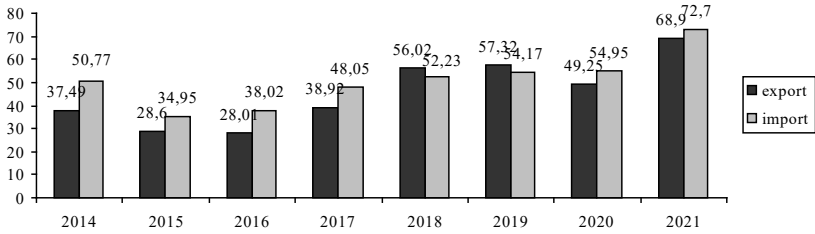
**Purpose of the study.** Explore prospects and identify the challenges and risks of Russian-Chinese cooperation for the economic security of the Russian Federation.

**Presentation of the main research materials.** The use of the so-called "Russian lever" is beneficial for both the Russian Federation and the People's Republic of China on economic issues and political positions on key issues on the international agenda, since it is built on the principles of strategic partnership based on equal trust and non-interference in each other's internal political processes.

Now, cooperation between Russia and China covers various areas, including such areas as economics, politics, science, education, culture and defense. Let us look at some of the current areas of partnership.

#### 1. Trade.

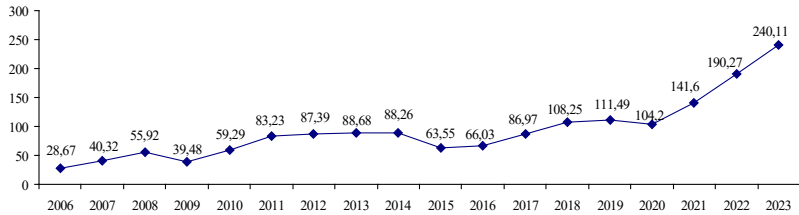
The volume of trade between Russia and China is constantly growing, and both countries are actively developing trade relations (Fig. 1).



Compiled by the author based on data [2]

**Figure 1.** Dynamics of exports and imports of the Russian Federation and the People's Republic of China in 2014-2021, billion US dollars

Beginning in 2020, which saw some decline due to COVID, trade volume has been steadily increasing from 2021 to the present day (Figure 2).



Compiled by the author based on data [2-4]

**Figure 2.** Trade turnover between the Russian Federation and the People's Republic of China in 2006-2023, billion US dollars

Such a sharp jump is due to both an increase in physical volumes of product supplies, incl. energy resources, and their rise in price due to the restoration of global demand [2-4].

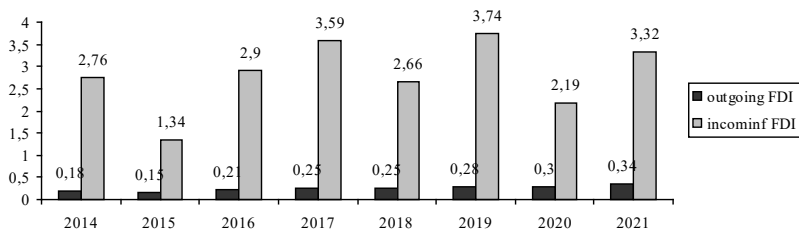
## 2. Energy.

Russia supplies China with oil, gas and coal, and also cooperates in the field of nuclear energy. According to official data from the Federal Customs Service of the Russian Federation, as well as analytical data presented in the public domain, one can state an increase in the volume of supplies of oil and petroleum products to China from the Russian Federation, both in physical and absolute terms for 2021-2023. At the same time, a number of scientists and politicians note a significant increase in exports of this category, especially in 2023, and point to Russia's primacy in the supply of products among other suppliers [2-4].

3. Infrastructure projects.

Russia and China cooperate in the implementation of various infrastructure projects, such as the construction of railways, gas pipelines and transport corridors (for example, “Europe - Western China”); integrated project for the production, liquefaction and supply of natural gas and oil (Zapsibneftekhim, Yamal LNG, Arctic LNG-2, Power of Siberia, Power of Siberia-2); production, processing and transportation of wood from Russia to China; biomedicine (implementation of molecular and personalized medicine); low carbon projects; digital economy; aviation and automotive industry, etc. [5-8].

The dynamics of foreign direct investment (FDI) within the framework of cooperation between the Russian Federation and China is shown in Fig. 3.



Compiled by the author based on data [9]

**Figure 3.** Dynamics foreign direct investment (FDI) within the framework of cooperation between the Russian Federation and China in 2014-2021, billion US dollars

Data indicate an asymmetry in the amount of funding for projects across countries. The main directions of Russian investment in China largely coincide with the industries in which Chinese investment in Russia is directed - mechanical engineering, financial institutions, insurance, innovation, scientific and applied activities, fuel and energy complex, chemical industry - but are associated with slightly different aspects of investments [10].

In general, it can be stated that mutual investment and joint implementation of infrastructure projects develop science, technology and innovation in Russia and China, and contribute to the stabilization and development of the economies of neighboring countries, maintaining international stability and security.

4. Military and military-technical cooperation.

Both countries conduct joint military exercises (“Vostok-2018”, “Center-2019”, “South-2020”) and exchange information and experience in the field of defense [11].

5. Education and science.

Cooperation between the Russian Federation and the People’s Republic of China in the educational and scientific sphere is associated with the academic mo-

bility of teachers, students and researchers, the implementation of joint educational programs, the creation of joint universities and research centers (for example, the Confucius Institute at leading Russian universities in the Russian Federation, MSU-PPI University in Shenzhen in China, etc.).

These and other areas of cooperation between Russia and China are of strategic importance for both countries and continue to develop, helping to strengthen Russia's economic security by expanding sales markets and diversifying the economy.

At the same time, despite the high volumes of trade and economic cooperation between the Russian Federation and the PRC, it is necessary to identify bottlenecks and barriers that impede the effective development of bilateral cooperation in the long term, and possible risks for the economic security of Russia [12]. These include:

1. Dependency on Chinese investment and trade.

According to the Gaidar Institute, China's share in Russian trade for the first ten months of 2023 amounted to 32%. However, despite the early implementation of the roadmap in terms of achieving the planned trade volume of 200 billion US dollars, it should be noted that the share of Russian products in China's total trade turnover is only about 4% [13]. At the same time, the authors indicate that China's dependence on the supply of industrial goods from unfriendly countries significantly exceeds its dependence on the import of Russian raw materials.

China's investment activity is carried out in limited sectors of the Russian Federation, mainly in the sector of natural resources and food production. Chinese capital is not invested in the development of the manufacturing industry [14].

Among the main factors that influence the investment attractiveness of the Russian Federation and hinder investment cooperation with China, one should highlight unfavorable geopolitical factors, building China's foreign policy based on the implementation of the so-called "soft power", the discrepancy between the investment strategy of the Russian Federation and the investment expansion strategy of the PRC, different approaches to doing business, etc. [10].

The following barriers, which logically follow from the above, should be called:

2. The risk of losing control over key sectors of the economy as a result of deepening cooperation with China.

3. Unequal partnership conditions, which can lead to possible conflicts of interest and pressure from China on the Russian market.

4. The situation is deteriorating for Russian manufacturers in the domestic market due to increased imports of competitive Chinese products.

5. Technological, scientific and educational cooperation with China may lead to an outflow of intellectual resources from Russia.

6. Potential risks for the national security of the Russian Federation in the event of a too close economic and political union with China. China can use economic influence to achieve its geopolitical goals.

This indicates a possible increase in the vulnerability of the Russian economy, loss of control over key resources, technologies, industries, and, ultimately, its own economic development, politics and security.

### **Conclusions.**

To summarize, it should be noted the positive nature of cooperation and prospects for the further development of mutually beneficial relations between the Russian Federation and the People's Republic of China. Both countries have sufficient potential and powerful economic influence on the world stage.

As part of joint work, Russia can increase the export of energy resources, raw materials and high-tech products, as well as ensure the implementation of projects in the field of infrastructure, transport and tourism. China, in turn, can provide access to the market for Russian goods and investments.

Participation in international organizations (SCO, BRICS, etc.) is important in expanding and strengthening mutually beneficial partnerships, developing foreign economic relations and creating greater opportunities for interaction between the Russian Federation and the PRC.

In general, to improve the efficiency of use of natural resources and production potential in both countries, it is important to develop cooperation in high-tech areas, scientific research, as well as in the field of aviation, space and nuclear energy. In the context of modern challenges, improving foreign trade and investment partnerships between Russia and Kyiv is considered extremely important and relevant.

In conclusion, one should agree with the opinion of G. Timchenko, one of the main experts on China among large executives, who argues, "... there is always a risk of losing to a stronger competitor, but... he should not dominate the issue of... relations. We must take into account the prospects that cooperation with Asian partners opens up in terms of attracting capital and technology. ... If we combine our capabilities, business will gain much more than it will lose" [15].

Thus, it is necessary to balance the relationship, evaluate all aspects of the partnership and take measures to reduce possible risks.

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DOI 10.34660/INF.2024.52.39.008

经济政策对俄罗斯可持续发展的影响：挑战与机遇  
**THE IMPACT OF ECONOMIC POLICY ON SUSTAINABLE  
DEVELOPMENT IN RUSSIA: CHALLENGES AND  
OPPORTUNITIES**

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注解。这篇科学文章致力于分析经济政策对俄罗斯联邦可持续发展的影响。作者审视了实施经济措施和战略以确保国家经济持续增长所面临的主要挑战和机遇，探讨了经济政策在形成平衡和可持续经济中的作用，并确定了主要方向和工具有助于实现这一目标。作者从整体上分析了经济多元化、刺激创新、确保金融稳定以及采取有效措施改善经济环境等问题。这篇科学文章考虑到现代经济环境中存在的挑战和机遇，为俄罗斯经济政策的发展提出了有价值的结论和建议。

关键词：影响力、经济政策、可持续发展、俄罗斯经济、挑战。

**Annotation.** *The scientific article is devoted to the analysis of the influence of economic policy on the sustainable development of the Russian Federation. The author examines the main challenges and opportunities that accompany the implementation of economic measures and strategies to ensure sustainable economic growth of the country, explores the role of economic policy in the formation of a balanced and sustainable economy, and also identifies the main directions and tools that contribute to achieving this goal. The author analyzes the problems of diversifying the economy, stimulating innovation, ensuring financial stability and taking effective measures to improve the economic environment as a whole. The scientific article presents valuable conclusions and recommendations for the development of Russian economic policy, taking into account the challenges and opportunities that exist in the modern economic environment.*

**Keywords:** *influence, economic policy, sustainable development, Russian economy, challenges.*

The market as a way of organizing economic life is recognized as undeniable and viable, however, the existing mechanism of market self-regulation requires addition from the active participation of the state. In the context of the global

financial crisis, states around the world are forced to take measures to intervene in the economy, which is manifested in injections of liquidity into the financial system and partial nationalization of companies and enterprises.

Even countries that previously eschewed active regulation are resorting to socialist methods in the economy. The period of enthusiasm for the “free” economy gave way to fatigue with radical liberalism, opening the way to a new economic system that has not yet received a final designation. It is obvious that it is no longer possible to do without strong government intervention. The “new capitalism” will face its own problems, perhaps no less serious than those of the “old one.” It is important to remember that the absence of clear criteria for the role of the state in the economy poses the risk of a transition to hypertrophied socialization combined with vicious protectionism.

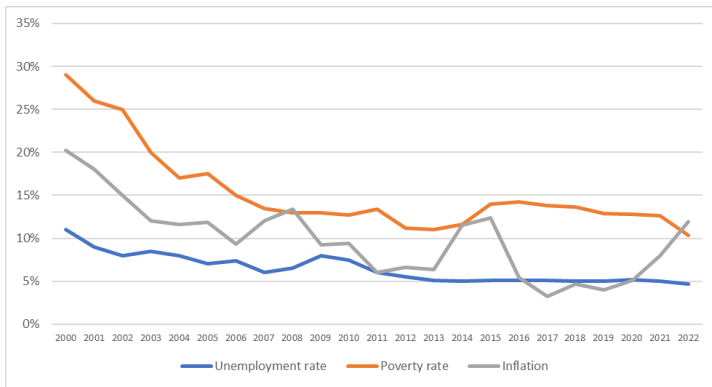
Economic sectors such as mining, energy, healthcare, education, retail, international tourism and civil aviation will face challenges in 2023 due to various factors, including the impact of world events and economic pressure from the West [1].

A sharp increase in lending both among enterprises and among the population became one of the significant trends in 2023, due to pent-up demand, government support and flexible rates, which led to inevitable inflationary growth, which amounted to 7.5% by December 2023.

Another significant cause of concern was the increase in the dollar/ruble exchange rate. Just the same, increasing the key rate of the Central Bank of the Russian Federation to 16% by mid-December 2023 was another step towards stabilizing the ruble and controlling inflation [2]. But economists have different opinions about the actions of the Central Bank of the Russian Federation, believing that it was a hasty measure.

The import substitution strategy sees significant potential for solving problems. Its implementation has led to increased competitiveness and output in several key industries, such as metals, oil, chemicals, consumer goods (food, clothing, footwear), agriculture, technical sectors and pharmaceuticals. Thus, Russia faces the important task of ensuring sustainable economic growth and improving the well-being of citizens. To achieve these goals, it is necessary to create a favorable business climate and encourage entrepreneurial activity, which will be the main condition for a new model of economic development.

Currently, one of the challenges for the Russian economy is the lack of conditions for sustainable growth. Despite efforts to overcome external threats and challenges, the economic system has not achieved the necessary balance, which gradually leads to a decrease in economic activity and investment, as well as to the devaluation of the ruble, which complicates the restoration of economic growth.

**Diagram 1***Levels of unemployment, poverty and inflation in the Russian Federation, %% [3]*

The need for structural reforms at the expense of budgetary resources led to the adoption of unpopular decisions, such as pension reform and VAT increases, which increased the fiscal burden on business and reduced the attractiveness of investment in conditions of low economic growth. It is also important to note that businesses have begun to face an unstable risk-return ratio, which limits its activity and investment opportunities.

The situation with financing investments in fixed assets for private companies remains unfavorable due to the unavailability of bank financing and high loan rates. The low level of innovation activity in the private sector also remains a problem, which makes it difficult to increase competitiveness and economic growth.

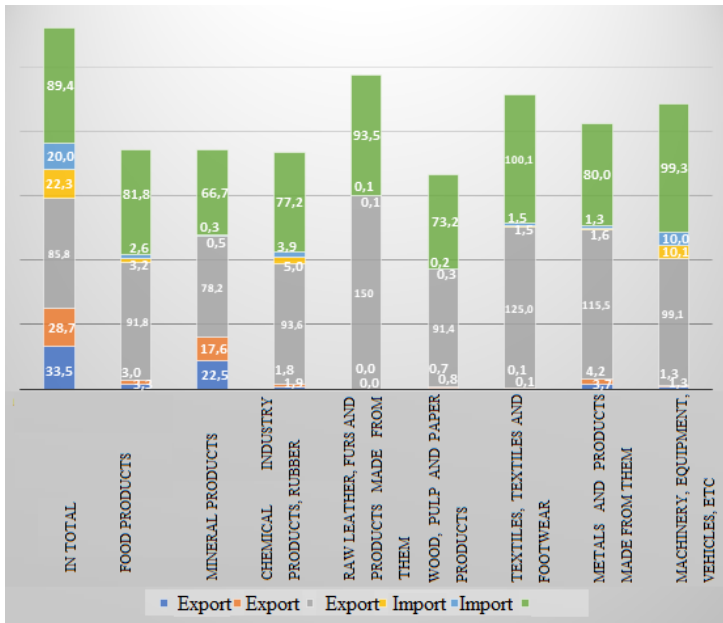
The decline in the standard of living of the population and the unbalanced structure of demand also have a negative impact on economic development, creating obstacles to the formation of new services and the development of education, healthcare and other areas. It is necessary to pay attention to increasing wages in order to stimulate economic growth and improve the social sphere.

Currently, it is important to understand that the share of imports plays a significant role in meeting the needs of the Russian economy, especially when it comes to critical resources such as manganese, chromium, titanium, lithium, iodine. The provided data on the share of imports of strategically important types of mineral raw materials and scarce minerals indicate the need to develop a policy of import substitution.

The Russian economy faces the challenge of diversifying and ensuring self-sufficiency in a number of industries, especially in the IT sector, agriculture and mechanical engineering. Imports of these goods and services account for more than 90%, which makes it important to develop an import substitution strategy.

**Diagram 2**

*Export and import of goods of the Russian Federation, billion US dollars [4]*



Expanding fields in Russia, creating joint production lines and concluding contracts with various countries are becoming strategic steps to ensure the defense of the economy. Import substitution programs focused on various sectors, such as the agricultural sector, mechanical engineering, and IT technologies, play a key role in establishing self-sufficiency and increasing the sustainability of the Russian economy.

Government measures aimed at gradually replacing imports with domestic production require an integrated approach and an emphasis on innovation, developing local production capabilities and increasing the competitiveness of Russian goods and services in the global market. It is important to take into account both economic and social factors for the successful implementation of the import substitution policy and ensuring sustainable development of Russia [5].

Currently, imports play an important role in meeting the needs of the Russian economy for a number of critical resources, such as manganese, chromium, titanium, lithium and iodine. Also, a significant portion of imports comes from bauxite (71%), copper (46%), molybdenum (42%), zirconium (85%), bentonite (91%) and kaolin (65%). However, a small share of imports comes from resources such as tungsten (25%), tin (0.1%), diamonds (1%) and bromine (2%).

Before the outbreak of the conflict in 2022, the main role in providing strategically important raw materials for the Russian economy was played by countries such as Ukraine, which supplied 83% of titanium, 51% of zirconium and 70% of kaolin, Kazakhstan, which supplied 87% of chromium and 73% of copper, Chile, supplying 71% of lithium, China, supplying 83% of bauxite, and Mongolia, which supplied 85% of fluorite, which is critical for the construction industry [4].

Currently, the main focus is on developing fields in Russia, as well as creating joint production projects and concluding contracts with countries in Southeast Asia, Latin America and Africa. These steps are aimed at ensuring the sustainability of the Russian economy and reducing dependence on imports of petroleum products and mineral raw materials.

Modern economic policy plays a key role in ensuring the sustainable development of the country. In his message to the Federal Assembly on February 29, 2024, the President of the Russian Federation proposed a number of measures and innovations aimed at stimulating the economy and creating a favorable investment climate for the development of the real sector.

One of the key directions of the proposed economic policy is to minimize business inspections and switch to an approach from 2025. This will reduce the bureaucratic burden on entrepreneurs and promote the development of entrepreneurial activity.

Another important proposal is to speed up the launch of a special IPO regime for high-tech companies in priority industries. This helps attract investment in innovative projects and develop the high-tech sector of the economy.

The President also proposed easing the tax regime for small and medium-sized businesses, which will contribute to their development and growth. Allowing small businesses to take credit holidays for six months and launching an irrevocable savings certificate for citizens will help improve the availability of credit and savings.

Additional allocation of funds for subsidies to companies for research and development and expansion of industrial mortgages, as well as capitalization of the industrial development fund, help stimulate innovation, develop technological potential and increase the competitiveness of domestic enterprises.

The Russian President emphasized the importance of capital inflows into the economy, especially into the real sector, through banks and the stock market. Project and equity financing mechanisms are effective tools for ensuring investment growth and development of the business sector [6].

It should also be noted that the current configuration of monetary and tax policies has led to a rapid increase in prices for raw materials in the domestic market, requiring the introduction of additional price regulation measures. A low ruble exchange rate, although beneficial to the competitiveness of the economy in the short term, may not be sufficient for modernization and efficient trade exchanges in the long term.

In general, the Russian economy is faced with challenges that require serious structural changes, improvement of the investment environment and innovation activity, as well as an increase in consumer activity and living standards of the population to ensure sustainable and long-term economic development [7].

From the analysis of data on the economic policy of the Russian Federation, several conclusions can be drawn:

1) The need to modernize the production core of the economy to create new sources of income comparable to income from the fuel and raw materials complex. Modernization should cover a wide range of industries that are especially important for economic development.

2) Increasing the size of the economically independent population, overcoming the raw materials bias in the economy and ensuring the modernization of jobs. This will help diversify the structure of production and increase its efficiency, which in turn will create new jobs with decent wages.

3) Strengthening social stability requires expanding the middle class and ensuring a fair distribution of the results of economic activity. This is possible through coordinated actions of the state, population and business to achieve national development goals.

4) The primary importance of introducing clear mechanisms for achieving set goals for society and business. Fair distribution of resources should contribute to the growth of incomes of the population and the reduction of economic differentiation.

5) Providing all opportunities for the development of regions and the transfer of the best experience at the federal level. Closing gaps in living standards and developing infrastructure in small towns and rural areas is an important aspect.

6) The need to develop industries that are currently imported in significant volumes, for example, the IT sector, agriculture and mechanical engineering. The economic policy of the Russian Federation should be based on creating opportunities for replacing imported products with domestic analogues and ensuring self-sufficiency.

7) Focus on increasing incomes of the population and satisfying accumulated demand should become key points for improving the economic situation in the country. Economic development should be based on the use of existing potential in the medium and long term.

Therefore, for the successful implementation of the development goals of the Russian economy, active attention from the state, society and business is required, as well as the adoption of balanced measures aimed at modernizing and strengthening the economic base, ensuring fair distribution of income and developing infrastructure in the regions.

The analysis shows that the current transformation of the world order can lead to increased tension between different states, which are already observed in a number of conflict regions, including Kosovo, Transnistria, Taiwan, Cyprus, eastern Turkey and others.

The study of the influence of economic policy on the sustainable development of Russia allows us to conclude that it is necessary to actively manage economic processes to ensure stable and sustainable development of the country. It has been revealed that world trends and global economic changes, such as trade conflicts and political tensions, can have a significant impact on the Russian economy.

To ensure sustainable development, it is necessary to develop comprehensive strategies to modernize the economy, develop infrastructure, stimulate innovation and strengthen financial sustainability. It is also important to take into account the risks and challenges associated with international conflicts and changes in the global economy in order to effectively respond to them and minimize possible negative consequences [8].

Taking into account the identified challenges and opportunities, it is necessary to focus efforts on the development and implementation of strategies aimed at increasing the sustainability and competitiveness of the Russian economy. This will ensure the sustainable development of the country in the face of changing global conditions and create favorable conditions for economic growth and prosperity of the population.

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DOI 10.34660/INF.2024.72.15.009

全球经济挑战背景下上合组织国家经贸合作  
**TRADE AND ECONOMIC COOPERATION OF SCO COUNTRIES  
IN THE CONTEXT OF GLOBAL ECONOMIC CHALLENGES**

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抽象的。本报告致力于分析全球经济挑战背景下上海合作组织成员国之间的经贸合作。探讨上合组织成员国经贸关系现状、发展举措和深化合作面临的障碍。此外，报告还讨论了通过上合组织内部合作应对全球经济挑战的战略，包括发展合作机制、吸引投资和技术以及加强可持续发展国际合作。最后，报告总结了分析，并重点提出了面对现代挑战加强贸易和经济合作的建议，强调其对整体经济进步和地区福祉的重要性。

**关键词：**经贸合作、上海合作组织、全球经济挑战、贸易、投资、技术发展、国际合作。

**Abstract.** *This report is devoted to the analysis of trade and economic cooperation among the countries of the Shanghai Cooperation Organization (SCO) in the context of global economic challenges. It examines the current state of trade and economic relations between SCO members, initiatives for their development, and obstacles to deepening cooperation. Furthermore, the report discusses strategies to overcome global economic challenges through cooperation within the SCO, including the development of cooperation mechanisms, attraction of investments and technologies, as well as strengthening international cooperation for sustainable development. In conclusion, the report summarizes the analysis and highlights recommendations for strengthening trade and economic cooperation in the face of modern challenges, emphasizing its importance for overall economic progress and the well-being of the region.*

**Keywords:** *trade and economic cooperation, Shanghai Cooperation Organization (SCO), global economic challenges, trade, investments, technological development, international cooperation.*

## **Introduction**

In the modern world, numerous global economic challenges impact various aspects of the global economy. These challenges include factors such as climate change, global financial crises, trade conflicts, the rise of nationalism, and more. These issues have the potential to affect the economic development and well-being of countries in different regions of the world.

In this context, the role of the Shanghai Cooperation Organization (SCO) in addressing these challenges is particularly noteworthy. Founded in 2001, the SCO is an international organization that unites eight member countries, including China, Russia, India, among others. The organization aims to strengthen a multipolar world and promote peaceful and stable development. As part of its activities, the SCO actively engages in cooperation across various fields, including politics, economy, culture, education, and security.

The relevance of studying the trade and economic cooperation of SCO countries in the context of global economic challenges is conditioned not only by the significant impact of this region on the global economy but also by the need to develop joint strategies to overcome complex economic problems. This is considering the increasing interdependence of countries in the modern world.

Examining trade and economic cooperation within the SCO has strategic importance in the context of global economic development. This analysis will reveal the strengths and weaknesses of cooperation, as well as identify opportunities for improving cooperation mechanisms and developing new strategies to effectively address global economic challenges.

The purpose of this study is to analyze the trade and economic cooperation of SCO countries in the context of global economic challenges and to identify opportunities for its strengthening.

To achieve the set goal, the following tasks need to be addressed:

1. Analyze the current state of trade and economic cooperation between SCO countries.
2. Study and assess initiatives and mechanisms aimed at developing trade and economic cooperation within the SCO.
3. Identify obstacles and challenges to trade and economic cooperation in the SCO and propose strategies to overcome them.

### **1. Current State of Trade and Economic Cooperation within the SCO**

#### **1.1. Overview of Trade and Economic Indicators among SCO Countries**

Trade and economic relations among the Shanghai Cooperation Organization (SCO) countries constitute a significant aspect of their external economic activity. Analyzing these indicators allows for assessing the level of economic interdependence, identifying main development trends, and pinpointing problem areas that require additional attention and efforts to overcome.

Since its inception in 2001, the SCO has significantly advanced in the development of its trade relations. The total trade volume among the organization's members has substantially increased over the past decades and continues to grow. SCO countries, such as China, India, Russia, and others, play a key role in the global economy due to their large domestic markets, growing consumer demand, and high production levels [2].

A detailed analysis of the trade structure shows that the main goods in the trade exchange among SCO countries are raw materials, energy resources, machinery and equipment, as well as light industry products. The growth in trade in these sectors indicates the close interconnection and interdependence of the SCO countries' economies [1].

However, despite positive trends, it should be noted that trade and economic relations among SCO countries also face several challenges and obstacles. These include trade barriers, currency fluctuations, political disagreements, and other factors that can hinder the development and expansion of trade relations.

Thus, the review of trade and economic indicators among SCO countries demonstrates both the positive aspects of their interaction and the problem points requiring attention and appropriate measures for overcoming and development in the future.

## **1.2. Initiatives for Developing Trade and Economic Cooperation within the SCO**

Initiatives for developing trade and economic cooperation within the SCO are extensive and multi-level. They include activities at the organization level as well as agreements and initiatives among individual members. One of the key initiatives is to facilitate the creation of favorable conditions for trade and investment between member countries. As part of this initiative, measures are discussed and adopted to reduce trade barriers, simplify customs procedures, standardize and harmonize rules and norms, and create special free trade zones and economic corridors.

Another important initiative is the development of economic integration measures. In this context, special attention is given to deepening cooperation in areas such as finance, transport, energy, information technology, and innovation. Within this initiative, infrastructure is being developed to ensure the efficient movement of goods and services, mechanisms are created for joint project financing, and the exchange of experience and advanced technologies is encouraged.

Strengthening international partnerships is also a significant direction for the development of trade and economic cooperation within the SCO. In this context, consultations and negotiations are organized with other regional and international organizations and partners. As a result of such cooperation, bilateral and multilateral agreements are concluded to jointly address economic problems, exchange experience and resources, and strengthen overall economic security [3, p. 480].

Such initiatives and measures allow SCO countries to actively develop trade and economic cooperation in the face of global challenges such as changes in the global economy, the rise of protectionism and trade conflicts, as well as challenges related to the pandemic and economic crises.

### **1.3. Obstacles and Challenges to Trade and Economic Cooperation in the SCO**

Obstacles and challenges to trade and economic cooperation in the SCO represent a complex set of factors that influence the development of economic relations among the countries of this organization. They have both structural and conjunctural character, forming a complex context for the implementation of cooperation within the SCO. Here are some of the main obstacles and challenges:

1. Trade barriers and regulation: One of the main obstacles are trade barriers, such as tariffs, quotas, and other restrictions that hinder the free flow of goods and services between SCO countries. This can lead to reduced trade volumes and weaken economic cooperation.

2. Political disagreements: Tense political relations between some SCO members can be an obstacle to the development of trade and economic cooperation. Political conflicts can lead to a reduction in trade as well as hinder the implementation of joint projects and initiatives.

3. Heterogeneity of economic interests: SCO member countries have diverse economic interests that may conflict with each other. For example, countries with more developed economies may face competition from less developed countries within the SCO, which can create tension in relationships and complicate cooperation.

4. Infrastructure problems: Insufficient development of infrastructure, especially in remote regions of some SCO countries, can be an obstacle to expanding trade ties. The need for investments in the development of transport, energy, and communication infrastructure can slow down the process of deepening economic cooperation [4, p. 320].

5. Global economic challenges: External economic factors, such as financial crises, fluctuations in energy and raw material prices, can have a negative impact on trade and economic cooperation in the SCO, creating uncertainty and risks for economic stability. Overall, overcoming these obstacles and challenges requires joint efforts from SCO member countries as well as the development of effective strategies to improve the institutional base and expand mutually beneficial economic cooperation.

### **2. Strategies to Overcome Global Economic Challenges through SCO Cooperation**

#### **2.1. Developing Trade and Economic Cooperation Mechanisms to Overcome Challenge**

In the rapidly changing landscape of the global economy, SCO countries need to actively develop and modernize trade and economic cooperation mechanisms

to successfully overcome the challenges they face. This requires not only strengthening existing cooperation tools but also exploring new approaches and solutions.

A primary task is the improvement of trade agreements between SCO member countries. This includes updating and supplementing existing free trade agreements to reflect current realities and consider the economies' specificities of the participants. Additionally, there is a need to actively work on simplifying trade procedures and reducing customs barriers, which facilitates a freer flow of goods and services within the SCO.

To effectively overcome the challenges of the modern world economy, it is also important to expand cooperation in innovation and technology. This involves creating special programs and projects for the exchange of experience in research, development, and the implementation of advanced technologies. Such initiatives can help improve the competitiveness of the SCO member economies and their adaptation to new challenges, such as digitalization and environmental sustainability.

Another important aspect of developing cooperation mechanisms within the SCO is the expansion of financial instruments and support mechanisms. This includes developing new project financing tools, such as infrastructure investments, and supporting small and medium-sized enterprises. The development of financial markets and banking services within the SCO contributes to stimulating economic growth and reducing vulnerability to external economic shocks.

Overall, developing trade and economic cooperation mechanisms within the SCO is a key aspect of successfully overcoming global economic challenges. This requires not only constructive dialogue and mutual understanding between member countries but also concrete actions to improve the institutional and economic cooperation base.

## **2.2. Attracting Investments and Technologies to Stimulate Economic Growth**

Attracting investments and technologies plays a key role in the economic development of SCO countries in the face of global challenges. In a world where technological innovations are becoming the driving force of economic development, it is crucial to ensure access to advanced technologies and attract investments for their implementation. Partnership among SCO countries in this area can contribute not only to an increase in investment volume but also to the exchange of experience and knowledge.

The primary task is to create a favorable investment climate in the SCO member countries. This involves eliminating bureaucratic obstacles, reducing tax and trade barriers, and increasing the transparency and reliability of the legal system. Implementing investment reforms and creating special economic zones can attract more foreign investors to the region.

SCO countries can focus on infrastructure development, which is an important factor in attracting investments. Infrastructure projects such as road construction, ports, airports, and energy facilities not only contribute to economic growth but also create additional opportunities for investment [5].

In addition to infrastructure projects, it is also essential to develop innovative industries and ensure access to advanced technologies. This can be achieved by promoting investments in research and development and by creating specialized technology parks and innovation centers.

SCO countries can conduct joint training programs and exchange experiences in technology and innovation, contributing to the development of human capital and enhancing the qualifications of specialists. This will allow the region's countries to use available technologies more effectively and increase their competitiveness in the global market.

Thus, attracting investments and technologies to stimulate economic growth within the SCO requires a comprehensive approach, including creating a favorable investment climate, developing infrastructure, supporting innovation and training personnel, which contributes to the sustainable economic development of the region.

### **2.3. Strengthening International Cooperation for Sustainable Development**

Strengthening international cooperation plays a crucial role in ensuring sustainable development not only for SCO countries but also for the entire global community. In the context of modern globalization, economic, environmental, and social issues are becoming increasingly interconnected and require joint efforts to address them.

Cooperation among SCO countries on the international stage can be the most effective means of overcoming various challenges. In terms of economic sustainability, expanding international trade and investments can contribute to increasing overall economic growth and reducing vulnerability to external shocks. It is also important to discuss and develop common trade standards and rules that can help reduce protectionism and strengthen international trade.

In the field of environmental sustainability, SCO countries can work together to reduce greenhouse gas emissions, protect biodiversity, and manage natural resources sustainably. This requires the development of joint programs and projects, as well as the exchange of experience and technologies in the field of environmental innovation.

Social sustainability also requires collective efforts. This includes combating inequality, poverty, and ensuring access to education, healthcare, and other basic services for all population segments. International cooperation can facilitate the exchange of best practices and resources to address social issues [6].

Thus, strengthening international cooperation for sustainable development is a key factor in ensuring the well-being not only of SCO countries but also of the entire global community. This requires joint efforts to develop and implement strategies and programs aimed at achieving common goals in economic, environmental, and social development.

### **Conclusion**

In conclusion, it is important to emphasize that trade and economic cooperation among SCO countries plays a key role in facilitating sustainable development not only for the member countries themselves but for the entire region and the global economy as a whole. Despite existing challenges and obstacles, which require joint efforts to overcome, the SCO has significant potential to strengthen economic ties and achieve coordinated results.

Analyzing the current state of cooperation within the SCO and considering various initiatives undertaken in this direction, it can be concluded that the organization continues to evolve and adapt to the changing conditions of the global economy. This confirms the importance of further improving existing cooperation mechanisms and developing new strategies to address economic challenges.

To overcome the challenges faced by the Shanghai Cooperation Organization (SCO), a comprehensive approach is needed, which includes active interaction among all member countries. This means that countries must unite their efforts and resources to develop and implement joint strategies to strengthen economic ties within the SCO.

An important aspect of such an approach is the deepening of trade and economic ties between countries. This includes the development of trade in goods and services and the creation of a favorable investment environment that facilitates capital inflow into the region. Attracting investments plays a crucial role in stimulating economic growth and contributing to the sustainable development of member countries.

Improving infrastructure is an integral part of strengthening the SCO's economic foundation. Developed infrastructure ensures the efficient functioning of trade routes, technology exchange, and the expansion of production capacities, contributing to sustainable economic growth and improving the well-being of the peoples of the region.

In conclusion, cooperation within the SCO is of great importance for maintaining peace and stability in the region and overcoming global economic challenges. Developing and strengthening this cooperation remains a priority task for all member countries, and only through joint efforts can sustainable economic prosperity and well-being be achieved for the peoples of the Shanghai Cooperation Organization.

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DOI 10.34660/INF.2024.69.79.010

20世纪90年代苏联经济转型的各个方面  
**ASPECTS OF ECONOMIC TRANSFORMATION OF THE USSR  
INTO THE 1990S**

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抽象的。苏联经济本质上是“计划经济”；私有财产实际上并不存在。20世纪90年代，经济来了个180度大转弯，从社会主义转向资本主义，带来了巨大的负面变化；同时对一些以前不知道如何在资本主义世界中运作的社会成员产生了冲击和积极影响

关键词：计划经济、私有化、优惠券、GDP下降、寡头、私有财产、改革。

**Abstract.** *Economy of the USSR was a “planned” by nature; private property practically did not exist. During the 1990s economy made a 180 degree turn and moved from socialist into capitalistic, creating enormous negative changes; at the same time shock and positive effect on some members in society who did not know how to function in a capitalistic world before*

**Keywords:** *planned economy, privatization, vouchers, the fall of GDP, oligarchs, private property, Perestroika.*

The changes that occurred in the Soviet state-economic system during the period of perestroika (1985-1991) became the object of study and discussion in the historical and legal literature. They evoke a variety of assessments based on different points of view. However, it is a generally accepted fact that the transformations of perestroika are associated with negative phenomena in the economy, which led to a decrease in the standard of living of Soviet citizens. There is some debate as to whether political or economic factors were the root cause of these changes. However, it should be noted that the purpose of perestroika was to improve socialism within the existing socio-economic system.

On April 8, 1986, General Secretary of the Communist Party of the Soviet Union Mikhail Gorbachev, during a visit to the Volga Automobile Plant in Togliatti, first mentioned the concept of “perestroika” (restructuring). This offhand remark became the slogan of the era. According to the concept of accelerated socio-economic development, by the year 1990, the production volume of food in the coun-

try was planned to increase by 2.5 times, by the year 2000 to double the industrial potential, and to solve the housing problem. However, the announced reforms not only failed to produce results but also led to a deterioration of the social and economic situation. By the beginning of 1987, a decline in production was evident. In 1989, for the first time, the state budget was in deficit. In 1991, compared to 1985, the economic growth rate decreased from +2.3% to -11%, the gold reserves decreased from 2500 to 240 tons, and the external debt of the USSR increased from 25 billion dollars to 103.9 billion dollars. The country was thriving with a “black market,” where artificially inflated prices for scarce goods were set. Inflation sharply devalued people’s savings and led to a serious decline in living standards. “By devaluing the ruble, the government effectively liquidated private savings of the population totaling 600 billion rubles. For the first time in many decades, unemployment became a problem in the USSR. Employees of the military-industrial complex, where millions of people were employed, were particularly affected. This marked the beginning of a decline in the country’s defense capability.”

“The Soviet Union needed change, but the country’s leadership at that time had no idea how to act,” Russian President Vladimir Putin said in a 2017 interview with American director Oliver Stone. – It was clear both to Gorbachev and to those who surrounded him that then the country needed change. However, today I can say with complete confidence that they did not understand what changes are needed and how to achieve them. As a result the social protection system was completely destroyed, entire sectors of the economy were completely stopped, the healthcare system has been virtually destroyed and is in a deplorable state. It turned out to be the army. And millions of people fell below the poverty line»[2].

Initially, perestroika included two main aspects: acceleration of socio-economic development and openness. Although the reformers’ focus was on economic issues, changes were envisioned within the framework of the planned economy that characterized the USSR before this period. Economic growth was planned by democratizing public relations and strengthening production discipline, as well as stimulating workers through bonuses. One of the goals of the “acceleration” was to reduce the gap with the West in key areas, including technology and scientific and technological progress.

However, for the majority of Soviet citizens, the lag was primarily manifested in shortages of goods and food. Therefore, ordinary people expected perestroika, first, to improve their lives and access to goods. While the highest echelons of power began to formulate a program of reforms after the arrival of M.S. Gorbachev to power [3, p. 74]. At the beginning of perestroika, the economic situation began to change. People learned such concepts as a cooperative, private business, felt an acute shortage of essential goods, food stamps appeared, and at the same time, hopes for a new life and new prospects appeared, including in doing busi-

ness. At that time, travel outside the country was significantly limited, especially to capitalist countries. However, there were certain reasons and opportunities for such trips [3, p. 98].

Firstly, some citizens had the opportunity to travel abroad on official business, which could be one of the ways to visit capitalist countries. Secondly, there were certain exchange programs for students and specialists between countries, which also provided the opportunity to travel abroad. Finally, some Soviet citizens could arrange travel packages abroad through travel agencies or organizations specializing in organizing trips abroad.

Perestroika coincided with the collapse of the Soviet economic system and military conflicts within the countries of the former USSR.

The economic model of the times of perestroika resulted from the planned structure of economic management, which had an imbalance of resources, a shortage of goods due to strict command control and the state monopoly on all spheres of the economy [4, p. 202].

In the USSR, there was neither competition (due to the state monopoly) nor the concept of bankruptcy; the heads of state-owned enterprises sought to obtain more resources from the state in order to fulfill the plan.

From 1986 to 1992, people were drawn into a completely new economic system, with all the features of “shock therapy”, price liberalization, privatization of entire enterprises by groups of individuals, and the use of vouchers issued to ordinary citizens to acquire a share in the former state property.

All these processes, often uncontrollable, organized crime, which arose in the early 1990s, the collapse of the country’s GDP, and economic illiteracy of citizens, gave rise to a class of new owners. Few people actually got rich, those who managed to take advantage of the chaos of the collapse of the previous political and economic systems, and those who deceived their compatriots by buying up industrial enterprises of the former USSR on the cheap. A privatization check with a face value of 10,000 rubles (voucher) became the road to wealth for conscientious entrepreneurs who bought up these securities issued to all citizens of the Russian Federation. [5, p. thirty].

Many ordinary people did not understand anything about vouchers and sold them for next to nothing. There was a serious economic crisis in Russia; the state needed money to pay pensions and money to public sector employees. The oligarchy, which began to emerge as a class in the early 1990s, quickly promoted the idea of buying up shares of former Soviet factories through loans-for-shares auctions and commercial banks owned by these same oligarchs.

Negative consequences of the economic transformation of the USSR in the 1990s: a sharp drop in the standard of living of Soviet citizens due to a shortage of essential goods; increased unemployment and labor market instability, leading

to fears of job loss; the lack of competition and the concept of bankruptcy in the Soviet economic model, which led to ineffective enterprise management and an imbalance of resources; the emergence of oligarchs and the uneven distribution of wealth in society.

According to Rosstat, the inflation rate in the Russian Federation was 160.4% in 1991, 2508.85% in 1992, 839.87% in 1993, 215.02% in 1994, and 133 in 1995. .33%, in 1996 – 21.81% [6].

According to Rosstat, the level of GDP in the Russian Federation was: in 1990 - 574.1 billion US dollars, in 1991 - 563.8 billion US dollars, in 1992 - 493.0 billion US dollars, in 1993 – 460.8 billion US dollars, in 1994 – 410.9 billion US dollars, in 1995 – 402.3 billion US dollars, in 1996 – 394.9 billion US dollars, in 1997 – 407 .8 billion US dollars[7].

Positive consequences of the economic transformation of the USSR in the 1990s: the opportunity for citizens to start their own business and gain access to private property; the emergence of new prospects and opportunities, including the opening of cooperatives and various types of enterprises; an opportunity for citizens to travel abroad and experience other cultures and technologies.

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DOI 10.34660/INF.2024.31.75.011

俄罗斯联邦执法当局系统的发展  
**DEVELOPMENT OF THE SYSTEM OF ENFORCEMENT  
AUTHORITIES IN THE RUSSIAN FEDERATION**

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抽象的。 研究目的是分析执达服务在确保司法活动法律制度方面的实际工作。 作者研究了俄罗斯法警机构形成的历史方面。 确实，法院的判决必须得到执行，只有这样，申诉人受到的侵害的权益才能得到充分恢复； 如果法院判决不被执行，那么司法系统保护债务人侵犯索赔人权利的工作就会受到质疑。 联邦法警局在执行已生效的法院判决方面发挥着重要作用，其活动旨在保护官员和个人的权益。

关键词：联邦法警服务、保护法院既定秩序的法警、法警、确保法院判决、政府机构数字化、债务人、收款人、第三方、法院、检察官。

**Abstract.** *The purpose of the study is to analyze the practical work of the bailiff service in ensuring the legal system of jurisdictional activities. The authors studied the historical aspects of the formation of the bailiff service in Russia. Indeed, the court decision must be enforced and only in this way the violated rights and interests of the claimant will be restored in full; if the court decision is not enforced, then the work of the judicial system in protecting the violated rights of the claimant by the debtor is called into question. The Federal Bailiff Service plays an important role in the execution of a court decision that has entered into legal force, and its activities are aimed at protecting the rights and interests of both officials and individuals.*

**Keywords:** *Federal Bailiff Service, bailiff for the protection of the established order of the courts, bailiff, securing a court decision, digitalization of government bodies, debtor, collector, third parties, court, prosecutor.*

In the modern world, the role of bailiffs is significant in ensuring the legal system. In Russia, the Federal Bailiff Service (FSSP of Russia) is one of the most

important bodies of state executive power and the only body for the enforcement of a court decision; in reality, it is a mechanism for ensuring justice, protecting the rights and legitimate interests of the individual, restoring violated rights, including the state [1].

As M.E. Saltykov-Shchedrin once noted, «the severity of Russian laws is softened by the non-binding nature of their execution, however, it is the bailiffs who play a key role in ensuring their mandatory execution, leveling the disdainful satirical attitude of society towards the law». The final goal of justice is considered achieved when the court decision is executed in full.

It should be noted that the bailiff service began in Ancient Rus, when the prince and his retinue went to the settlers to collect tribute, using coercive and forceful methods to take away property from debtors.

Princess Olga played a significant role in streamlining the collection of tribute after the death of Prince Igor during her reign from 945 to 964. Its reform implied mandatory fixed contributions, which made it possible to strengthen the financial condition of the state, thanks to the work of the bailiff, who was entrusted with collecting tribute from the «common people» and thus, these actions of officials became the prototype for collecting a 7 percent enforcement fee from the debtor.

The first sources include the Code of Laws, including the collection «Russian Truth», which regulated, among other things, the specifics of foreclosure on property and the procedure for collecting taxes and fees during the reign of Yaroslav the Wise (1019-1055). The first officials who were responsible for the execution of court decisions, according to the history of the legislation of Ancient Rus', were assigned during the period of adoption of regulatory legal acts at the end of the 11th-15th centuries.

In the 13th-15th centuries, the role of bailiffs was played by «legal officers», who monitored the payment of duties, the established order in court, and were also empowered to search for fugitive slaves, conduct searches and even use torture [2, p. 35-36].

Before the reign of Peter I, bailiffs were called «allotres» and only they were given the right to bring the accused to court, and also assisted in their search, including the seizure of property from the debtor.

On 19 October 1865, Emperor Alexander II signed the «Regulations on the Enforcement of Judicial Statutes», which gave the activities of bailiffs legal status.

It should be noted that for a long period of time, the execution of court decisions was entrusted to bailiffs attached to the courts, which had double subordination: the department of justice and the courts, and thus many mistakes were made in practical activities, which led to the reform of the legislation of the Soviet period and in 1997 Federal Laws № 118-FZ «On Bailiffs» [3; 4] and № 119-FZ «On Enforcement Proceedings» [5] were adopted. Their existence lasted a short

period, since many legal errors were made and the quality of enforcement was reduced to a minimum.

It must be said that the bailiff service dates back to ancient times and to this day it is aimed at the execution of jurisdictional acts, therefore the need for its functioning is historically determined.

In general, the bailiff service plays an important role in the legal system, performing key social functions in protecting and restoring the violated rights and interests of citizens and legal entities, including the state.

The right to judicial protection and to the execution of a jurisdictional act that has entered into legal force are directly related, since the right to restoration in court belongs to every individual and if the court decision is not enforced in full, then the activities of the courts will be reduced to no.

To ensure the execution of a court decision, bailiffs apply enforcement measures (Article 68 of the Federal Law «On Enforcement Proceedings» [6]) and the main task of bailiffs is to implement court decisions if the debtor does not intend to execute it voluntarily.

To implement the assigned tasks, bailiffs are endowed with a set of rights and responsibilities and these include: seizure of funds, foreclosure of the income of a debtor-citizen, foreclosure of the debtor's movable and immovable property, imposition of a temporary restriction on leaving the Russian Federation, forced eviction, move-in and much more.

To exercise their powers, bailiffs also interact with registration authorities, law enforcement agencies, financial and credit organizations and the Federal Tax Service.

It seems that the improvement of the enforcement mechanism has acquired a new stage of development in connection with the transition of government bodies and departments to working with digital services, including an automated electronic document management system. The use of new technologies in the practical activities of the bailiff service has made it possible to send electronic requests to authorized bodies and organizations, which make it possible in the shortest possible time to obtain not only information about the debtor and determine his property status, but also to promptly impose or remove prohibitions and restrictions provided for by current legislation, and aimed at forcing the debtor to fulfill the requirements contained in the executive document, or to refrain from performing enforcement actions.

Digitalization of government institutions is their transfer to the provision of services in electronic form. So, for example, at the present time it is possible to remotely submit an application, petition, complaint to the Federal Bailiff Service, or to a specific bailiff, on the State and Municipal Services portal, and timely submit or request various information, including monitoring the progress of development of enforcement proceedings by stages.

If you have a registered account on the State Services portal, the interested party can instantly obtain information about the initiation of enforcement proceedings and receive a bailiff's order in electronic format, certified by the official's electronic digital signature.

The introduction and use of information technology has significantly increased the efficiency of the bailiff service in the enforcement of jurisdictional acts and, as a result, ensured adequate protection of the rights and legitimate interests of citizens and legal entities.

Thus, it seems necessary to note that the Federal Bailiff Service is a state body for the enforcement of judicial acts and acts of bodies authorized to issue enforcement documents.

In modern Russia, the role of bailiffs is becoming increasingly important, confirming in their daily work their ability and effectiveness in solving the tasks assigned to them to restore the violated rights of claimants.

In its activities, the bailiff service creates conditions for proper enforcement of court decisions and protects legitimate interests and restores the violated rights of both citizens and legal entities, through the forced execution of court decisions and acts of other bodies, ensures that persons who have committed crimes and administrative offenses within the competence of the Federal Bailiff Service are held accountable. The quality of ensuring justice depends only on the competent and timely actions of the bailiff.

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DOI 10.34660/INF.2024.42.92.012

中国 DVGAFK 本科生第一年和第二年的心理运动表现比较  
**COMPARISON OF PSYCHOMOTOR PERFORMANCE OF  
UNDERGRADUATES FROM THE PEOPLE'S REPUBLIC  
OF CHINA IN THE FIRST AND SECOND YEARS OF STUDY  
STUDYING AT DVGAFK**

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抽象的。 本研究的目的是比较中华人民共和国本科生在 DVGAFK 学习的第一年和第二年在该大学 2023 年上半年的训练课程和竞争负荷期间的心理运动表现。

在对本科一年级和二年级学生精神运动指标的研究过程中发现，平均而言，除了错误数指标外，研究期间几乎所有指标均无显著差异。 对绿色的选择反应和歧视反应的时间。

中华人民共和国本科生的平均心理运动技能指标大多以平均发展水平为特征。

关键词：本科生、中华人民共和国、精神运动技能、精神运动能力、硬件和软件综合体 (APK) “NS-Psychotest”、福乐球、中枢神经系统的功能状态。

**Abstract.** *The purpose of this study was to compare the psychomotor performance of undergraduates from the People's Republic of China in the first and second years of study at DVGAFK during training sessions and competitive loads for the first half of the 2023 year of study at the University.*

*In the course of the study of psychomotor indicators in undergraduates of the first and second years of study, it was found that, on average, there were no significant differences in almost all indicators during the study, except for the indicator of the number of errors in the choice reaction to green and the time in the discrimination reaction.*

*Most of the indicators of psychomotor skills on average among undergraduates from the People's Republic of China are characterized by an average level of their development.*

**Keywords:** *undergraduates, People's Republic of China, psychomotor skills, psychomotor abilities, hardware and software complex (APK) "NS-Psychotest", floorball, functional state of the central nervous system.*

### **Introduction**

Currently, undergraduates from the People's Republic of China are studying at the Far Eastern State Academy of Physical Culture within the framework of international cooperation between DVGAFK and Harbin Sports University (PRC) [1]. In the 2022-2023 academic year, 4 undergraduates from the People's Republic of China studied at DVGAFK in the first and second years of study.

In addition to the academic load of the University's study program and the participation of Chinese undergraduates in a number of competitions held at the DVGAFK from October to December 2022 [4], practical classes in bandy and hockey were held with undergraduates of the first and second years of study twice a week for 1,5 hours on the ice of the Regional Palace of Bandy Yerofey Arena, classes were held twice a week in the DVGAFK gym and on myofascial release for one hour and once a week for one hour floorball and football classes were held in the DVGAFK universal hall.

The purpose of our study was to compare the psychomotor performance of undergraduates from the People's Republic of China in the first and second years of study at DVGAFK during training sessions and competitive loads for the first half of the 2023 year of study at the University

#### **1. The experimental part**

In accordance with the stated purpose of this study, undergraduates from the People's Republic of China in the first and second years of study tested the main indicators of psychomotor activity using the psychophysiological complex "NS-Psychotest" [6].

In addition to the study of psychomotor indicators, the indicator of the critical frequency of light flashes (KCHSM) was also studied as an assessment of the level of fatigue of the cortical part of the visual analyzer [7].

After the participation of undergraduates in a number of tournaments in April-May 2023, psychomotor indicators were tested on May 31, 2023 in the morning hours in the laboratory of "Monitoring of physical Condition" of the Far Eastern State Academy of Physical Culture. The number of undergraduates surveyed in both groups was 4 each. From April 5-7, 2023, the Yerofey Arena hosted the night student bandy League with the participation of teams from three universities: DVGAFK-1, DVGAFK-2, TOGU, DVUI of the Ministry of Internal Affairs of the Russian Federation. Two second-year undergraduates played for the DVGAFK-1 team, and two first-year undergraduates played for the DVGAFK-2 team. Following the results of the tournament, the student team of DVGAFK-2 became the

bronze medalist, and the TOGU team became the silver one. The winner of the tournament was the student national team of DVGAFK-1 [2].

On May 6, 2023, the DVGAFK student hockey team held a master class and a friendly game for young hockey players in Birobidzhan dedicated to the 78th anniversary of Victory in the Great Patriotic War with the players of the EAO national team. The match ended with a score of 6:6. Three undergraduates of the 1st and 2nd years of study took part in the DVGAFK team [3].

From May 10 to 12, 2023, the Platinum Arena hosted a hockey festival among students of educational institutions of higher education in the Khabarovsk Territory. 5 teams took part in the festival: DVGAFK-1, DVGAFK-2, DVGUPS, TOGU, DVUI of the Ministry of Internal Affairs of the Russian Federation. Two second-year undergraduates played for the DVGAFK-1 team, and one first- and second-year undergraduates played for the DVGAFK-2 team. According to the results of the festival, the DVGAFK-1 team won all the victories and took first place, and the DVGAFK-2 team took 2nd place[5].

## 2. Results

As a result of the conducted research, comparing the indicator of OSPR in undergraduates of the first (34 seconds-above average) and second year of study (36 seconds-above average), we found that on average there were no significant differences, while one undergraduate of the second year of study had the lowest indicator - 46 seconds (below average).

The indicator of simple visual-motor reaction (ms) on average had no significant differences between undergraduates of the first and second years of study and corresponds to the average rate of sensorimotor reaction, while two undergraduates of the first and second years of study revealed a low rate of sensorimotor reaction and one undergraduate of the first year of study had an indicator of 198ms (high rate of sensorimotor reaction) (Table 1).

**Table 1**  
*Indicators of psychomotor skills of undergraduates from the People's Republic of China in the first and second years of study*

Psychomotor indicators	May 2023		Difference		P
	Undergraduates of 1 year of study	Undergraduates of 2 year of study			
	X±m	X±m	Units	%	
PZMR (milliseconds)	234±18,4	233±12,1	1	0,4	p >0,05
OZPR (seconds)	34±3,9	36±4,8	2	5,9	p >0,05
Choice reaction (milliseconds)	338±37,1	347±12,1	9	2,7	p >0,05

Number of errors per red color (times)	0	0	0	0	p >0,05
Number of errors per green color (times)	1,75±0,5	0,5±0,2	1,25	250	p <0,05
Concentration of attention (milliseconds)	290,5±27,2	293,5±15,3	3	1	p >0,05
Volumetric attention (milliseconds)	353±28,6	364±10,7	11	3,1	p >0,05
Discrimination reaction (milliseconds)	375±37,4	349±23,5	26	6,9	p <0,05
Number of errors per color (times)	0,75±0,2	0,75±0,2	0	0	p >0,05
The number of exact reactions (times) in the RDO	11,5±0,2	12±0,1	0,5	4,3	p >0,05
KCHSM (hertz)	38±1,9	39±1,5	1	2,6	p >0,05

Comparison of the time of complex visual-motor reaction (choice reaction) between undergraduates of the first year of study (338ms-high speed sensorimotor reaction) and undergraduates of the second year of study (347ms- higher than average sensorimotor reaction rate) on average also showed that there were no significant differences ( $p > 0,05$ ), while two undergraduates of the first and second years of study had a high reaction rate, even better among first-year students, but one undergraduate of the first year of study had the lowest indicator (437ms-low rate of sensorimotor reaction). The number of errors in green (times) on average was significantly lower in boys of the second year of study (0,5) compared with boys of the first year of study (1,75) by 2,5 times. Two boys of the first year of study had the number of errors of 2 and 3, and the other two had one each, and two boys of the second year of study had the number of errors of one each.

The concentration index (ms), recorded on average in undergraduates of the first year of study (290,5 is an intermediate type between the inert and mobile types of higher nervous activity), had no significant differences with the indicator of undergraduates of the second year of study (293,5- intermediate type between inert and mobile type of higher nervous activity) ( $p > 0,05$ ), while two undergraduates of the second year of study recorded indicators slightly below average (inert type of higher nervous activity), and one undergraduate of the first year of study recorded the lowest indicator (362ms - inert type of higher nervous activity).

The index of volumetric attention recorded on average in undergraduates of the first year of study (353ms is an intermediate type between the inert and mobile types of higher nervous activity), although it did not have a significant difference with the indicator of undergraduates of 2 years of study (364ms is an inert type of higher nervous activity) ( $p > 0,05$ ), was much better in undergraduates of the first

year of study. Thus, this indicator in three boys of the second year of study was below the average, and in boys of the first year of study this indicator was below the average in only one, although the lowest (425ms is an inert type of higher nervous activity).

The indicator of the number of accurate reactions to a moving object (times) during the study for undergraduates of the first year of study (11,5- the average level of accuracy of reactions) on average did not have a significant difference compared with the indicator of undergraduates of the second year of study (12- the average level of accuracy of reactions), but two undergraduates of the first year of study recorded indicators a low level of reaction accuracy against one second-year undergraduate.

The indicator of the critical frequency of light flashes (KCHSM) (Hz) during the study in undergraduates of the first year of study (38 Hz-high mobility of nervous processes in the cortical department of the visual analyzer) on average also had no significant difference compared with the indicator of undergraduates of the second year of study (39 Hz-high mobility of nervous processes in the cortical department of the visual analyzer), but at the same time, three undergraduates of the second year of study recorded high rates against two undergraduates of the first year of study and one undergraduate of the first year of study recorded the lowest rate with signs of fatigue of the visual analyzer (32 Hz- mobility of nervous processes in the cortical department of the visual analyzer is reduced).

And only the indicator of the reaction time of distinction during the study, on average, in second-year students (349ms - intermediate type between inert and mobile types of higher nervous activity) was significantly higher by 6.9% compared with the indicator of first-year students (375ms - intermediate type between inert and mobile types of higher nervous activity), while one student of the first year of study had the lowest indicator (489ms- an inert type of higher nervous activity).

## 2. Conclusions

A comparative analysis of psychomotor indicators among undergraduates from the People's Republic of China in the first and second years of study showed that, on average, there were no significant differences in almost all indicators during the study, except for the indicator of the number of errors in the choice reaction to green and the time in the discrimination reaction, which were better for undergraduates in the second year of study.

But it is worth noting that, despite the non-reliability of differences in many indicators of psychomotor skills between undergraduates of the first and second years of study, the indicator of OCR, simple visual-motor reaction, volumetric attention and concentration was slightly better in first-year students compared with second-year students, and the indicator of the number of accurate reactions to

the moving object, the time in the selection reaction and the critical frequency of light flashes were slightly better for second-year students compared to first-year students.

In general, it can be said that in both groups of undergraduates of the first and second years of study, many indicators of psychomotor skills are characterized on average by an average level of their development, and such an indicator as the OSPR is characterized by an above-average level, the KCHSM indicator corresponds to a high level of development of psychomotor abilities and, finally, the indicator of time in the reaction of choice for undergraduates of the first year of study is characterized by a high level, and second-year undergraduates have an above-average level of development of their psychomotor abilities, this indicates a fairly good level of the functional state of the central nervous system.

All this was reflected in the fact that many undergraduates from the People's Republic of China successfully competed in a number of competitions in April-May 2023 in the DVGAFK-1 and DVGAFK-2 teams that won prizes, but almost all second-year undergraduates turned out to be more titled.

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为学生和研究生教授英语学术写作

## TEACHING ACADEMIC WRITING IN ENGLISH FOR STUDENTS AND POSTGRADUATES

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抽象的。学术写作教学与学生和研究生课程教学尤其相关。这种相关性是由于学生和研究生在大学学习时必须掌握的学术写作类型，如笔记、演示文稿、报告、项目、文章、论文。

学术写作课程的主题、教授学术写作某些方面的最有效练习的示例、当前的教科书和手册……在我们的报告中了解更多相关信息。

关键词：学术写作、学术写作流派、流派方法、笔记、论文（论文类型）、演示文稿、报告、项目、文章、论文、定义、描述性文本、叙述性文本、推理文本、释义、文本压缩、引用、链接、标点符号。

**Abstract.** *Teaching academic writing is particularly relevant in teaching courses for students and postgraduates. This relevance is due to such genres of academic writing as notes, presentation, report, project, article, dissertation, which students and graduate students must master while studying at a university.*

*Topics of academic writing programs, examples of the most effective exercises for teaching certain aspects of academic writing, current textbooks and manuals... Read more about this in our report.*

**Keywords:** *academic writing, genres of academic writing, genre approach, notes, essay (types of essay), presentation, report, project, article, dissertation, definition, descriptive text, narrative text, reasoning text, paraphrasing, summary, quotes, links, punctuation.*

Academic writing involves the creation of written texts of various genres for educational purposes, so teaching undergraduate and graduate students this type of writing in English seems especially relevant to us.

For students who have the opportunity to intern abroad, for example, students of the Higher School of Management of St. Petersburg State University (hereinafter referred to as SPbSU), the essay genre is especially relevant. Abroad, a huge number of test works are performed in this genre. Thus, the focus of academic



writing programs for students with internship opportunities will be the essay genre.

While working at the Department of Business Foreign Language at St. Petersburg State University, we participated in the development and implementation of a curriculum for students of the Higher School of Management in academic writing, covering the following topics.

Module 1: Elements of Writing: Definitions, Examples.

Module 2: Process Essays.

Module 3: Comparison/Contrast Essays.

Module 4: Cause and Effect Essays.

Module 5: Argumentative Essays.

Consequently, the training of students at the Higher School of Management was carried out using a genre approach.

After studying all types of essays, students completed exercises to determine the type of essay with interest.

In teaching graduate students of the A.I. Herzen Russian State University (hereinafter A.I. Herzen RSPU), the topic of the academic writing course has changed, as the main genre has changed, or rather the genres: presentation, lecture, report, article, dissertation, relevant for graduate students. Accordingly, the course on academic writing thematically reveals the features of the above genres.

Unit 1: Text Structure.

Unit 2: Elements of Writing: Definitions, Exemplification, Classification, Generalisation.

Unit 3: Types of texts: Physical Description, Description (Process and Procedure), Narrative, Discussion.

Unit 4: Interpretation of Data.

Unit 5: Paraphrasing and Summarizing.

Unit 6: Quotations and References. Punctuation.

In order to teach academic writing as a separate course for students or certain aspects of this type of writing as part of a general course for graduate students, we developed an introductory lesson (Slide 1), in which students and graduate students mastered the basic terminology of the course (Slides 5,6), tested in at the end of the lesson with the help of a quiz (Slides 7,8), which is partly humorous in nature. The introductory lesson begins with comics (Slides 2,3,4), reflecting the main problems of academic writing (8 of the 43 slides of the introductory lesson are posted below).

Slide 1



Slide 2



Slide 3



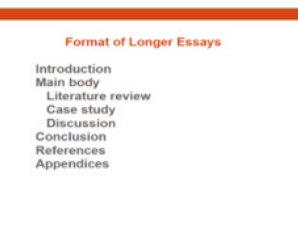
Slide 4



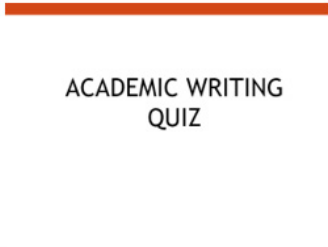
Slide 5

Notes	Report	Project
Essay	Dissertation/ Thesis	Paper

Slide 6



Slide 7



Slide 8



For Section 2: Elements of Writing: Definitions, Exemplification, Classification, Generalization, a walking game was created that significantly enlivens the lesson with undergraduate and graduate students (see Table 1).

*Table 1*  
*Board Game*

FREE SQUARE →	test (Description)	examination (Description)	interview (Description)	thesis (Simple Definition) ↓
project (Description) ↓	essay (Simple Definition)	paper (Extended Definition)	hostel (Simple Definition)	FREE SQUARE ←
survey (Simple Definition) →	questionnaire (Extended Definition)	experiment (Description)	research (Extended Definition)	library (Simple Definition) ↓
Music (Academic Definition) ↓	History (Academic Definition)	Zoology (Academic Definition)	certificate (Description)	synonym (Simple Definition) ←
phrase (Extended Definition) →	Astronomy (Academic Definition)	Chemistry (Academic Definition)	Grammar (Extended Definition)	<b>FINISH</b>

In Section 3, part Description (Process and Procedure), we use an exercise - cut text for a better understanding by students of the structure and intra-text connections.

Studying Unit 6: Citations and References. Punctuation, when working with punctuation, to determine the function of specific punctuation marks, we used a crossword puzzle, and also offered students text without punctuation marks for practice in their placement (an example of the text is presented below).

**a survey of general personal views**

the main findings were as follows blue was the most popular colour chosen by 28% this was followed by green and purple each selected by 22% and red with 11% no one chose brown orange or black there was no real significance in the choice of a lucky number 3 6 and 13 each chosen by 11% 33% of the students said they had none

Table 2 below provides a list of academic writing textbooks that have helped us effectively teach students and postgraduates over the years.

**Table 2**  
*Textbooks and teaching aids for teaching students and postgraduates academic writing*

1. Alice Oshima, Ann Hogue. Writing Academic English. Pearson Longman, 2006.
2. Alice Oshima, Ann Hogue. Introduction to Academic Writing. Pearson Longman, 2007.
3. Gabi Duigu. Visuals: writing about tables and diagrams. Academic English Press, 2001.
4. Jordan R.R. Academic Writing Course. Pearson, 2001.
5. Stephen Bailey. Academic Writing: a Handbook for International Students. New York, 2011.

Thus, teaching academic writing can become interesting and entertaining if you use interesting materials and exercises in the classroom, selected and developed by the teacher independently, as well as borrowed from special textbooks on teaching academic writing.

DOI 10.34660/INF.2024.74.70.014

关于2023年新认证指标的问题  
**ON THE ISSUE OF NEW ACCREDITATION INDICATORS 2023**

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抽象的。本文简要分析了俄罗斯联邦科学和高等教育部 2023 年 4 月 18 日第 409 号令中涉及新认证指标的规定。根据分析结果，作者得出了第5号指标在所有认证指标体系中的优先价值及其在教育活动质量总体评估中的特殊地位。

关键词：认证、教育活动、质量、教育服务。

**Abstract.** *the article provides a brief analysis of the provisions of the Order of the Ministry of Science and Higher Education of the Russian Federation dated April 18, 2023 No. 409 as it relates to new accreditation indicators. Based on the results of the analysis, the authors come to the conclusion about the priority value of indicator No. 5 in the system of all accreditation indicators and its special status in the general assessment of the quality of educational activities*

**Keywords:** *accreditation, educational activities, quality, educational service.*

In accordance with the Order of the Ministry of Science and Higher Education of the Russian Federation dated April 18, 2023 No. 409<sup>1</sup> from 01.09.2023, the next version of accreditation indicators for educational programs of higher education is in effect. A comparison of these indicators with the previously valid<sup>2</sup> shows the following.

Firstly, accreditation indicators are given in Order No. 409 regardless of the purposes of their application. In the previously effective Order No. 1094, in relation to the use of such indicators, three goals were assumed:

<sup>1</sup> Order of the Ministry of Science and Higher Education of the Russian Federation dated April 18, 2023 No. 409 “On approval of accreditation indicators for educational programs of higher education, methods for calculating and applying accreditation indicators for educational programs of higher education” - hereinafter “Order No. 409”, “New Order” or “Order on accreditation indicators.”

<sup>2</sup> Order of the Ministry of Education and Science of Russia dated November 25, 2021 No. 1094 “On approval of accreditation indicators for educational programs of higher education.”

- for state accreditation of educational activities;
- to carry out accreditation monitoring;
- for the implementation of federal state control (supervision) in the field of education.

Each of the above goals corresponded to a specific set of indicators, their meaning and the minimum number of points.

As can be seen from the current Order No. 409, the use of accreditation indicators is intended only for the purposes of state accreditation of educational activities.

Secondly, the number of accreditation indicators corresponds to the number previously provided for in Order No. 1094 for state accreditation of educational activities.

Thirdly, the name of the accreditation indicators in the New Order has been adjusted to clarify them.

Fourthly, the criterion values of the analyzed accreditation indicators have practically not changed, with the exception of indicator No. 3 “The share of scientific and pedagogical workers with an academic degree and (or) academic title (including theological academic degrees and titles), and (or) persons equated to them in the total number of employees implementing the educational program of higher education - AP 3”, for which now there is not a three-dimensional criterion, but a two-dimensional one, which in turn presupposes either compliance of this indicator with the federal state educational standard, or - not matching it.

Based on the above, it should be noted that no “revolutionary” changes in the issue of accreditation of educational programs of higher education can currently be expected, which is also confirmed by the validity period established in paragraph 3 of Order No. 409 - until 01.09.2029 G.

At the same time, an analysis of the conclusions of expert groups regarding ten educational programs about the **failure to confirm** the compliance of their quality of education with accreditation indicators, made based on the results of work in the summer period of 2023 (Table No. 1) allows us to draw some conclusions.

Table 1

Name of educational organization	Name of educational program and level of higher education	Name of the accreditation indicator and its value based on the results of the accreditation examination	Date of conclusion of the expert group <sup>3</sup>
		The share of students who completed 70% or more of the tasks of diagnostic work, formed from the fund of assessment funds of the organization carrying out educational activities, according to the declared educational program	
1. FSBEI of HE «Kursk State University»	Judicial and prosecutorial activities (specialty)	3%	23.06.2023 г.
2. ANO of HE «Interregional Open Social Institute»	Psychology (Master's degree student)	20%	23.06.2023 г.
3. PEI of HE "Institute of Social and Humanitarian Knowledge"	Psychology (Bachelor's degree student)	17%	30.06.2023 г.
4. FSBEI of HE «Penza State Technological University»	Energy and resource-saving processes in chemical technology, petrochemistry and biotechnology (Master's degree student)	33%	30.06.2023 г.
5-6. FSBEI of HE «Kazan National Research Technological University»	Regional Studies of Russia (Bachelor's degree student)	13%	07.07.2023 г.
	Public Policy and Social Sciences (Bachelor's degree student)	0%	07.07.2023 г.
7. FSBEI of HE «Southern Federal University»	Chemical Technology (Bachelor's degree student)	0%	07.07.2023 г.

<sup>3</sup> The article uses material presented on the official website of the Federal Service for Supervision of Education and Science - [https://obrnadzor.gov.ru/search\\_\ron\\_docs/](https://obrnadzor.gov.ru/search_\ron_docs/) (date of access - 09/03/2023)

8. SEI of HE “Komi Republican Academy of Public Service and Management”	Jurisprudence (Master’s degree student)	21%	07.07.2023 г.
9. NEI of HE «Moscow Institute of Jurisprudence»	Management (Bachelor’s degree student)	0%	28.07.2023 г.
10. ANO of HE «Interregional Open Social Institute»	Psychology (Master’s degree student)	0%	25.08.2023 г.

Firstly, a random sample of ten educational programs, characterized by their different subject areas, as well as the geography of educational organizations implementing these programs, clearly illustrates the key importance of the accreditation indicator indicated in Table No. 1, the minimum threshold value of which should be 55% as in accordance with Order No. 1094, which was in force at the time of the inspection, and in accordance with the currently valid Order No. 409.

Secondly, this is the only accreditation indicator that is directly related to assessing the quality of education as a process implemented in a specific educational organization. Because of this, it requires direct measurement.

Thirdly, other accreditation indicators provided for by the New Order, in our opinion, have an indirect (albeit important) significance for the purposes of assessing the quality of educational activities.

For example:

1. average USE score (indicator 1<sup>4</sup>) 1. or entrance test (indicator 1.1.) characterizes the educational level of students admitted to the first year;

2. the presence of an electronic information and educational environment (indicator 2) determines only the fact of using this environment, its current state, but not its effectiveness;

3. the share of scientific and pedagogical workers with an academic degree and/or academic title (indicator 3) determines the potential of the teaching staff implementing educational programs;

4. The share of employees among managers and (or) employees of organizations whose activities are related to the focus (profile) of the educational program being implemented (indicator 4) can only determine the practice-oriented potential of individuals participating in the implementation of a specific program;

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<sup>4</sup> Hereinafter, the indicators provided for by the Order of the Ministry of Science and Higher Education of the Russian Federation dated April 18, 2023 No. 409 “On approval of accreditation indicators for educational programs of higher education, methods for calculating and applying accreditation indicators for educational programs of higher education” are used.



5. the presence of an internal system for assessing the quality of education (indicator 6), assessed based on the presence of a local regulatory act on the internal system for assessing the quality of education and a self-examination report of an educational organization, can only determine the presence or absence of such a system, but not its quality indicators.

Thus, based on the above, it follows that indicator No. 5, which determines the proportion of students who have completed tasks of diagnostic work at the required level, formed from the fund of assessment tools of an educational organization, is not only the main one of all those specified in the New Order, but also the most technologically advanced.

At the same time, this indicator requires the unification of the rules for the development and formation of funds of assessment tools capable of objectively indicating the achievement of professional and other competencies provided for in the relevant educational standards. We believe that universities should be offered methodological recommendations regarding the rules for the formation of such funds of assessment tools, their storage, updating and use in the educational process.

In itself, the use of accreditation indicators for the implementation of control and supervisory activities is quite justified, however, such a formulation of the question makes, in our opinion, possible its development towards determining criteria for assessing the quality of the educational service provided. Leaving aside the discussion about the legal nature of education as a phenomenon of social life [1, p. 56-62; 3], however, we believe it is not correct to deny the presence of signs of a service as an object of civil rights within the framework of the assessment of educational activities, as well as the legal consequences arising from this [2, p. 21-25].

Based on the foregoing, we believe that the fund of assessment funds, implemented as part of checking the compliance of the activities of an educational organization with the requirements related to accreditation indicator No. 5, in fact being a “measure” of the quality of the educational activity being checked, in its final value (i.e. based on the results of the audit) can serve only as a general indicator of the quality of the educational service provided. As for the possibility of using a fund of assessment tools to assess the quality of educational services in relation to a particular student, such a possibility does not seem obvious to us due to a number of factors, which include the characteristics of an individual educational trajectory, the degree of success in mastering the educational program and other individual characteristics of the student, incl. psychological, motivational, etc.

At the same time, the very question of the ability of a fund of assessment tools to determine the quality of the educational service provided in relation to a particular student is also not without meaning, if we proceed from the assumption

that such assessment tools should adequately reflect all the features of the implemented educational technology that need to be taken into account and some “ the level of individual abilities of students specified by the educational organization, corresponding to the parameters of this technology.

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DOI 10.34660/INF.2024.38.95.015

俄中跨文化互动研究的理论和方法论

**THEORETICAL AND METHODOLOGICAL ASPECTS OF THE  
STUDY OF RUSSIAN-CHINESE INTERCULTURAL INTERACTION**

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注解。目前，俄中互动的理论和实践方面不仅在俄罗斯和中国，而且在其他国家都受到特别关注。作为伙伴关系基础的国家间关系的人道主义领域也不例外。为了扩展有关俄中跨文化互动的理论和方法方面的知识，对这一科学知识领域的研究进行了系统分析。研究结果确定并描述了中俄互动的特征，证实了使用跨学科方法进行此类研究的可能性，同时还揭示了社会文化活动现在正在获得新的含义，在于建立各国人民之间的关系，并开辟科学学科的新方向。

关键词：俄中跨文化互动、俄罗斯、中国、人道主义合作、社会文化活动。

**Annotation.** *Currently, the theoretical and practical aspects of Russian-Chinese interaction are of particular interest not only in Russia and China, but also in other countries. The humanitarian sphere of relations between states, which acts as the foundation of partnership, is no exception. In order to expand knowledge about the theoretical and methodological aspects of Russian-Chinese intercultural interaction, a systematic analysis of research in this area of scientific knowledge was carried out. As a result of the study, the features of Russian-Chinese interaction were identified and characterized, the possibility of using an interdisciplinary approach to such research was confirmed, and it was also revealed that socio-cultural activity is now acquiring a new meaning, which consists in the formation of relationships between the peoples of countries and opens up new directions in the scientific discipline.*

**Keywords:** *Russian-Chinese intercultural interaction, Russia, China, humanitarian cooperation, socio-cultural activities.*

Intercultural interaction of states in the humanitarian sphere is the object of study of many sciences: cultural studies, sociology, pedagogy, linguistics, anthropology and others. For example, O. N. Astafieva, I. P. Bezuglova, A. A. Velik and others considered intercultural communication from a cultural point of view [13]. From the standpoint of social anthropology, Western scientists considered intercultural interaction: E. Tylor, F. Boas, etc. and representatives of the Soviet and Russian school: Y. V. Bromley, A. A. Belik, Y. N. Emelyanov, etc. [9, pp. 97–99].

J. Berry and D. E. Ponarina studied the problems of intercultural communication from the perspective of social psychology. T. G. Stefanenko, Z. V. Sikevich [13]. B. Malinovsky, A. Radcliffe-Brown and others studied issues of intercultural dialogue from the perspective of ethnography and sociology. Strategies for cross-cultural and intercultural approaches are highlighted in the works of D. Matsumoto, D. Berry and others. Techniques for conducting cross-cultural research and increasing the level of intercultural competence were developed by G. Triandis, D. Matsumoto, K. Kushner and others [9, pp. 97–99].

Intercultural interaction as a system of mutual exchange of ideas, concepts, concepts, which allows one to realize the characteristics of one's own culture and understand the uniqueness of the culture of another people, was studied by M.M. Bakhtin, P.S. Gurevich, M.S. Kagan, Y. Habermas [13].

Dialogue as a sociocultural phenomenon of intercultural interaction in the context of Russian-Chinese intercultural interaction - A.N. Chumakov, and others. The intercultural humanitarian cooperation between Russia and China has been studied by Y.M. Galenovich, S.S. Zengin, S.G. Luzyanin, A.N. Chumakov, L. Stark, P.S. Yurchenko, Zhu Chunmin, and others.

It is worth noting the work of R.K. Tangalicheva, who, based on the analysis of various scientific approaches and concepts, studied the theoretical-methodological foundations of intercultural communication in the conditions of globalization. For this purpose, interdisciplinary foundations of intercultural communication research were analyzed; cross-cultural and intercultural approaches to the study of intercultural communication were considered; applied aspects of intercultural communication in modern conditions were examined.

Intercultural humanitarian cooperation is both a condition and a result of public practice in the main spheres of society's activities: political (the will of states enshrined in normative legal acts), economic (production, distribution, exchange, consumption of cultural goods and values as economic goods), social (interaction of individuals, social groups, different communities in the process of creating and mastering cultural goods and values), cultural.

Culture (Latin *cultura* – cultivation, upbringing, education, reverence) is a multi-valued concept, the variety of definitions of which is evidenced by the presence of a typology of definitions of culture proposed by American anthropologists A. Kroeber, F. Kluckhohn and F. Strodbeck and later supplemented by other authors, including includes 18 types of definitions [6].

As the basic concept of cultural studies, it denotes a historically certain level of development of society, creative forces and the development of human abilities, expressed in the types, forms of organization of people's lives and activities, as well as in the material and spiritual values they create [2].

Since culture is a sphere of social activity regulated by the state, it makes sense to refer to the definition fixed in the legal act: culture is a set of formal and informal institutions, phenomena and factors influencing the preservation, production, transmission and dissemination of spiritual values (ethical, aesthetic, intellectual, civil, etc.) [14].

Intercultural communication and cooperation are the sphere of implementation of socio-cultural activities, therefore it is necessary to focus on its definitions. T.G. Kiseleva and Y.D. Krasilnikov understand socio-cultural activity as a historically conditioned, pedagogically oriented and socially demanded process of transforming culture and cultural values into an object of interaction between the individual and social groups in the interests of the development of each member of society; they indicate that the relationship between the social and cultural, mediated by the activities of various subjects, gives rise to a special reality, captured by the concept of “socio-cultural activity”, while the social is a form of interaction, the cultural is the result of interaction [8, pp. 57–62].

V.V. Tuev defined socio-cultural activity “as a process of introducing a person to the cultural values of society and the active inclusion of the person himself in this process, organized by social institutions” [12].

The term “socio-cultural activity” is usually understood as a historically established branch of scientific knowledge, an educational subject and social practice in the socio-cultural sphere. In this work, socio-cultural activities will be considered from the point of view of social practice, in particular in such areas of SCS implementation as intercultural cooperation and communications, artistic culture and art, education and career. In our case, these three areas are interconnected: it is international cooperation and communications that make it possible to solve educational and career development issues, mutual enrichment of the artistic culture and art of the peoples of both countries.

International cooperation can be seen as a manifestation of intercultural interaction. From the point of view of G. A. Avanesova, the interaction of cultures is “a special type of direct relations and connections that develop between at least two cultures, as well as those influences and mutual changes that appear in the course

of these relations. Of decisive importance in the processes of interaction of cultures is the change in states, qualities, areas of activity, values of one and another culture, the generation of new forms of cultural activity, spiritual guidelines and signs of people's lifestyle under the influence of impulses coming from outside" [1, p. 70–71].

E.I. Sabanenکو defines intercultural interaction as a way of existence of social reality, expressed by a set of heterogeneous, multi-level connections, relationships, processes of functioning of large, open social systems (cultures), influencing each other and characterizes it as an integral element of social existence, a way of joint existence of large social structures of systemic order characterized by intensive exchange of information, values, results of activities, etc. [11, pp. 816-819].

Studying the theoretical aspects of dialogue in Russian-Chinese relations, A.N. Chumakov concluded that in the modern world essentially the only way to resolve contradictions and ensure balanced development is dialogue based on concessions, compromises, recognition of the right to defend one's position by the parties involved in the process; not just any dialogue, but a cultural-civilizational one. The scholar highlights the necessary conditions for such dialogue: common morality (at the global level - universal human), a common legal system (a unified legal field for subjects of international relations), religious tolerance. A.N. Chumakov characterizes the features of contemporary dialogue existing in the conditions of globalization, which creates both conditions and obstacles for it (integration generated by globalization provokes a reaction - the desire of national cultures to defend their originality and independence), nevertheless, culture and civilization serve as the basis for dialogue; considers the possibilities and prospects of dialogue in the modern world [16, pp. 10-28].

When organizing intercultural interaction between China and Russia, it is necessary to take into account possible risks, which are understood as "some possibility of an unfavorable situation arising, leading to various losses, failures, losses as a result of Russian-Chinese interaction" in the humanitarian sphere [3, p. 11.].

Y.P. Vetrov and S.S. Zengin, studying the risks of Russian-Chinese integration interaction in education, conclude that there are the following risks: "loss of cultural identity, commercialization, decrease in the quality of education, neo-colonization, orientation towards status and ratings, increase in fake documents, risk of economic rationality, reputational risk, risk of brain drain and talent drain", risk of socio-cultural adaptation of Chinese students, decrease in the quality of training of foreign students, increase in inequality" [3, p. 13]. Based on the fact that interaction in education is part of humanitarian interaction, it can be concluded that these risks are inherent in intercultural interaction as a whole.

An important approach to the issue of China's position in the modern world is the concept of "Discursive Power" [5], which was initially considered as a chan-

nel of foreign policy communication and with Xi Jinping coming to power as a strategic task aimed at creating positive conditions for China to achieve a leading position in the world through participation in creating new rules for a new world order. Despite the prevalence of the concept of “discursive power” in state documents, scientific research and media publications over the concept of “soft power” in the last decade, it can be assumed that both concepts have a significant place, and that China’s work on strengthening its cultural diplomacy - “soft power” actively continues and is seen as the first stage, while “discursive power” is seen as the second stage in building a new world order and China’s role in it, as well as a plan for reviving China as a leading actor in Asia.

A number of features can characterize analysis of the theoretical part of the problem:

- intercultural interaction is simultaneously studied by a number of sciences, which gives different interpretations of concepts, goals, factors, directions of intercultural interaction;
- intercultural interaction, first of all, was actively studied by Western scientists, initially for specifically applied economic and political purposes;
- since the beginning of the study of this area of theory and practice was laid in the West, the more commonly used term denoting intercultural interaction has become the term “intercultural communication”; That’s why there is a pressing question in scientific circles about the relationship between the concepts of “intercultural interaction” and “intercultural communication”;
- There is a question about the predominance of the concepts of “discursive power” and “soft power” in China’s domestic and foreign policy life, which has implications for the future of Russian-Chinese humanitarian relations.

Considering intercultural interaction from these positions imposes a certain responsibility on the organizers and subjects of interaction from the point of view of state security.

Analysis of scientific literature allows us to conclude that the theoretical basis laid by researchers of intercultural interaction from the point of view of various sciences and academic disciplines makes it possible to study Russian-Chinese humanitarian cooperation using an interdisciplinary approach.

International cooperation and communication as a sphere of implementation of socio-cultural activities is now acquiring a new meaning, which lies in the formation of relationships between the peoples of countries and opens up new directions in the scientific discipline.

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现代英语中领导力的表达

## EXPRESSIONS OF LEADERSHIP IN CONTEMPORARY ENGLISH

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抽象的。 本文重点分析了表示体育、商业和政治背景下领导地位的英语词素。 描述了单词和单词组合的语义和结构特征,并对各个专业领域使用的领导力表达进行了比较。 有关相关主题的大众媒体出版物已被用作语言材料的来源。 该研究揭示了在描述领导职位的背景下使用体育术语的趋势。 使用直接和间接含义的词位以及具有隐喻含义的表达方式。 所分析的表达可以根据语法形式、结构和语义分为几组。

关键词: 一词多义, 词义, 表示, 领导表达, 词汇意义扩展。

**Abstract.** *The paper is focused on the analysis of English lexemes denoting leadership positions in sport, business, and political contexts. Semantic and structural features of words and word combinations are described, and a comparison of leadership expressions used in various professional spheres is provided. Mass media publications on relevant topics have been used as the source of linguistic material. The study reveals the trend toward the use of sport terms in contexts describing leadership positions. Lexemes in their direct and indirect meanings, as well as expressions with metaphorical meanings, are used. The expressions analyzed may be divided into several groups in terms of grammatical forms, structure, and semantics.*

**Keywords:** *polysemy, word meaning, to denote, expressions of leadership, expansion of lexical meaning.*

**Relevance.** In our rapidly developing world, being in the lead is one of the main criteria for success. In some spheres, success may be measured in terms of numbers, profits, and rankings, reflecting corporate or individual achievements. In language, words are used for that purpose. A measure of success is described with lexical means, syntactic structures, or stylistic devices. The timely character of

the research is explained by the fact that human language keeps developing along with civilization, new phrases are coined, new terms emerge, and new meanings are acquired by already existing lexemes.

**Purpose.** This paper is focused on expressions of leadership in contemporary English language, namely, on their semantic and structural specifics. A comparison of leadership expressions used in various professional spheres is provided.

**Materials and methods.** Publications in English provided in US and UK mass media and on global websites, such as The Guardian, Yahoo, Motorsport, Variety, etc. were used as the research materials. Word definitions were based on online dictionaries, such as Merriam-Webster's Dictionary (10), Cambridge Dictionary (2), Collins Dictionary (5), Oxford Advanced Learner's Dictionary (11), and Urban Dictionary (15). Expressions denoting leadership in sport, business, politics, and culture have been analyzed using the method of semantic analysis.

**Overview.** Research into related topics has been done by some scholars already. Linguistic markers of leadership have been described by Olga Litvishko et al. (2021), while linguistic means denoting concepts similar to that of leadership - the concept of victory - have been studied by N. Dubenets (2021). Issues of using words and word combinations in their indirect or metaphorical meanings in various spheres of human activity have been addressed by Agnieszka Kaleta (2019).

**Results and discussion.** Prior to analyzing contexts where leadership expressions are used, let us address an English-English dictionary to see the definition of 'leadership'. Merriam-Webster's Dictionary suggests the following meanings: 1) the office or position of a leader; 2) capacity to lead; 3) the act or an instance of leading (Webster, 2024). For contexts describing sport tournaments, business competition, or elections, the third meaning appears to be most relevant. Likewise, among the definitions provided by Cambridge Dictionary, the one relating to marketing is most suitable for the contexts under study: 'the position of being a company, product, etc. that is more successful than its competitors' (Cambridge, 2024).

Lexemes such as 'leading' (adj.), 'top' (adj.), 'key' (adj.), 'the biggest', 'the largest', 'the best'; 'to lead' (v), to dominate (v), supremacy (n), expressions 'to be in the lead', 'to be on top', 'the first to do something' etc. are traditionally associated with winning. For instance, the expression 'a key player' has long been used to denote major market participants:

*(1) If we are in the midst of a global race for artificial intelligence (AI) breakthroughs, China is definitely a key player (Caudevilla, 2024).*

Though the use of the article 'a' indicates the possibility of other major players being present in the market ("one of the key players"), the expression is strengthened with the adverb 'definitely', thus pointing to China's strong position.

The verb 'to dominate' is also rather popular in contexts denoting leadership, for instance, in combinations 'to dominate the race', 'to dominate the market', etc. The following example describes the leading position in the technology market:

(2) North America dominated the generative AI market in 2022 accounting for 40.2% of total market revenue (Zia, 2023).

Many of the lexemes listed above ('top', 'key', 'big', etc.) are used in their second meanings when denoting leadership or positions of importance. (For example, the polysemantic adjective 'big' may refer either to the size of a company or to its significance, which constitutes two different meanings). So, the phenomenon of polysemy is used as a tool for building word combinations, allowing authors to choose word meanings that suit the context most fully and make the text sound more vivid.

An example of a polysemantic verb used for denoting a leading position is 'to overtake'. According to Collins Dictionary, in its first meaning, his verb denotes passing a vehicle or a person by moving faster than they are (for instance, overtaking a vehicle), while the second one appears to be most suitable for contexts describing business competition: "If someone or something overtakes a competitor, they become more successful than them" (CD). This meaning may be exemplified by the following context:

(3) *China has overtaken the US as the world leader in both scientific research output and "high impact" studies, according to a report published by Japan's science and technology ministry (The Guardian, 2022).*

As the first meaning of this verb raises associations with driving, even its second meaning (a more successful competitor) makes the context more dynamic. A similar effect is achieved by using sports terms for describing leadership. For instance, the verb 'to notch' is synonymic to the verb 'to score' (Collins). In the context describing the election race, the expression 'to notch a win' denotes a candidate's victory:

(4) *US primary elections: Biden and Trump notch wins in five states (The Guardian, 2024)*

In the contexts under study, sport terms are used in their indirect (as above) or direct (see below) meanings. In sports discourse we often come across the expression denoting the awards stand (podium): 'to stand on the top step'.

(5) *There have been podiums, sure, and a series of impressive drives throughout that history - but none of the 21 Japanese racers who have attempted to qualify for an F1 race have ever basked in the glory of standing upon the top step (Boxall-Legge, 2024).*

In the above context, it indicates the purpose of the podium directly, that is, a place for awarding the winners. Victory, or leadership, is indicated in a descriptive way: to stand upon the top step. Text recipients are supposed to have sufficient knowledge of objective reality, namely, sport ceremonies, to understand this meaning correctly. However, a metaphorical use may also be possible in some other contexts, especially given the fact that some scholars mention metaphorical extension among the mechanisms of polysemy (Vicent, A., Falkum, I., 2017).

In the next expression - to bag a podium - an expansion of a lexical meaning takes place: the verb ‘to bag’ means “to claim something as yours before somebody else claims it; to take something before somebody else can get it” (Oxford Advanced Learner’s Dictionary, 2024). In line with Vicent and Falkum’s research, we can define it as a metaphorical extension of the meaning of the lexeme ‘bag’:

(6) *Then there was Kamui Kobayashi, who burst onto the scene with Toyota as a replacement for the injured Timo Glock at the end of 2009, but the Amagasaki-born racer bagged just one podium (fittingly at the 2012 Suzuka race) in a midfield career (Boxall-Legge, 2024).*

Interestingly, the verb ‘to bag something’ was first formed from the respective noun by means of linguistic conversion, and then acquired an indirect meaning - the one seen in the above context. These transitions testify to a constant development of the language.

The adjective ‘top’ is among the lexemes that traditionally denote leadership. In combination with the noun ‘dogs’, however, it becomes an informal expression:

(7) *Fears for Joe Hart but Manuel Pellegrini still sees Manchester City as top dogs (The Guardian, 2015)*

According to contemporary dictionaries, ‘a top dog’ is understood as 1) ‘a person, group, or thing in a position of authority especially through victory in a hard-fought competition (Webster, 2024), 2) ‘the most successful or powerful one in a particular group’ (Collins Dictionary, 2024). In contrast with the above, Urban Dictionary suggests a different meaning of this expression: ‘a person who uses their good looks, charm, and humour (if they possess it) to dominate others’ (Urban Dictionary, 2024).

It is due to the contextual environment only that the most suitable meanings can be selected, and those are the first and the second ones described above. This conclusion may be made based on the fact that the article is focused on a football team’s success, and on the players’ professional skills, not on someone trying to charm others.

The adjective ‘heavy’ may be used as a synonym for ‘real’ (Urban Dictionary). Thus, the expression ‘a heavy favourite’ in terms of a competition (an Oscar nomination) may denote ‘a leader of the race):

(8) *Heavy favorites, including the entire “Oppenheimer” contingent, helped place their success in context (Herman, 2024).*

As mentioned above, profits become a measure of success in quite a number of cases. Since the popularity of a movie has a direct correlation with the number of spectators, and hence, box sales, the expression ‘a box office draw’ indicates a financial and probably an artistic success of a product:

(9) *“Barbie,” the biggest box office draw of the Best Picture nominees, took home only a single Oscar, for Billie Eilish’s original song “What Was I Made For?” (Herman, 2024).*

This context confirms once again that sufficient knowledge of life facts is necessary for ‘deciphering’ such descriptive ways of indicating success as in Examples (5) and (9).

The expressions analyzed above may be divided into the following groups: 1) in terms of grammatical forms: adjectives (heavy, key, top), verbs (to overtake, to dominate, to notch), nouns (podium); 2) in terms of structure: units equal to one word (lead (v)), combinations consisting of several words (to bag a podium to notch a win); 3) in terms of semantics: sports terms used in a direct or an indirect meaning (to stand on the top step), word combinations describing a situation of profit-making (a box-office draw), and lexemes with a broad meaning (top, key, etc.).

**Conclusion.** Many contexts reveal a trend toward the use of sport terminology in an indirect meaning in respect to other contexts (e.g., politics). However, more word combinations denoting leadership may emerge on the basis of other lexemes, as language evolves continuously. According to Gerd Carling et al. (2023), “a meaning expands by polysemy, and in a hypothetical second state, the lexeme carries two polysemous meanings, of which one is the core meaning... the initial core meaning may become lost, and in a third hypothetical state, the lexeme has only the second (originally polysemous) meaning” (Carling, 2023). Thus, new meanings may be established, and even replace the initial ones. Besides, new expressions may be motivated by the influence of national cultures, personal experience and associations. Given that, linguists, translators, and other specialists in cross-cultural communication should keep track of language evolution, which is sometimes most fully represented in the mass media.

**Conflict of interest.** The authors declare no conflict of interest.

**Research transparency.** The study received no sponsorship. The authors are solely responsible for submitting the final version of the manuscript for publication.

**Declaration of financial and other relationships.** All authors participated in the development of the topic, study design and writing of the manuscript. The final version of the manuscript was agreed upon and approved by all authors. The authors received no royalties for the study.

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DOI 10.34660/INF.2024.30.93.017

欺诈作为一种社会危险：社会学分析

## FRAUD AS A SOCIAL DANGER: SOCIOLOGICAL ANALYSIS

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抽象的。文章讨论了网络欺诈作为一种越轨行为的问题。作者研究了欺诈的发展历史以及这一现象在现代世界的状况。对与互联网欺诈蔓延（包括年轻人中的互联网欺诈）相关的情况进行了分析。

关键词：欺诈、社会偏差、社会、破坏、网络犯罪。

**Abstract.** *The article discusses the issue of Internet fraud as a type of deviant behavior. The authors examined the history of the development of fraud and the state of this phenomenon in the modern world. An analysis is given of situations related to the spread of Internet fraud, including among young people.*

**Keywords:** *fraud, social deviation, society, destruction, Internet crimes.*

From the point of view of sociological science, the essence of fraud is considered as one of many types of negative social deviations. We focused on this problem because it is complex and its relevance today is difficult to overestimate.

The history of this phenomenon is as old as the world. Initially, society self-organized as a special form of joint activity of people in it. Thus, people functioning within society, from the point of view of a systems approach, are bearers of certain positive functions necessary for society as a system. That is, relatively speaking, each of the individuals who make up society plays the role of a kind of cog that allows the gigantic mechanism of the system of social relations to work. But even before the emergence of socio-political institutions in society, cases of dishonesty of individual people in it were recorded. From the point of view of social development and public safety, this contributed to the emergence of such a phenomenon

as social danger. That is, these are those people or groups of people who, through their actions (or inactions), create a certain threat to life, health and prosperity both to society as a whole and to individuals in it. Naturally, this slows down the progress of society as a whole, increases social tension and contributes to the emergence of social cataclysms. In our work we will consider one of the types of social danger, extremely common and relevant in our time - fraud.

In Rus', the first mentions of the term "fraud" date back to the 16th century and, in particular, appears in the famous Code of Laws of Ivan IV the Terrible, published in 1550. An extract from it reads: "and a fraudster receives the same punishment as his father." That is, the judicial system of that time recognized fraud as a very destructive social phenomenon, for which the authors of the Law Code considered the death penalty to be a fair punishment. Fortunately or unfortunately, today's realities of the Criminal Code of the Russian Federation are far from such radical solutions. According to Article 159 of the Criminal Code of the Russian Federation, fraud is understood as the committed illegal gratuitous seizure of someone else's property for personal gain, by deceiving the owner of this property. [1] This is punishable by either a fine, correctional labor, or imprisonment from 2 to 10 years (in various special cases of fraud). In the realities of modern Russian law enforcement, this is a crime of medium gravity and, as a rule, either a suspended sentence is assigned, or there is still the possibility of terminating the criminal case in connection with the reconciliation of the parties.

As historical practice shows, fraud becomes widespread during the development of business relationships in society and the formation of well-developed domestic and foreign trade. Development prospects, wealth, and business activity are a kind of breeding ground for the formation of such a destructive social phenomenon. That is, we can come to the interesting conclusion that the richer and more successful a society is (the analogy with an organism suggests itself here), the greater the number of scammers (parasites) found in it.

Today, in our modern world, fraud as a negative social phenomenon has become widespread and has a significant impact on the functioning of society as a whole. Paradoxically, its development was especially influenced by the achievements of scientific and technological progress. Over the past literally two or three decades, the level of development of technology and technology has made a huge step forward, allowing the virtualization of deviant behavior practices, including the emergence of Internet fraud. Despite the increasing shift of this negative phenomenon towards the virtual side, real people become victims of scammers, which directly causes them and society as a whole absolutely non-virtual socio-psychological and economic damage. It would not be an exaggeration to say that this social phenomenon is becoming a new challenge to civilization in the era of digital society and poses a great challenge to the social system as a whole.

The situation related to the manifestation of Internet fraud practices in Russia can be characterized as complex and with disappointing dynamics. According to the report of the Ministry of Internal Affairs of the Russian Federation, in the period from January to June 2020, 222.5 thousand crimes committed using information and telecommunication technologies were registered, which is 91.7% more than during the same period in 2019. Now, the share of this type of crime in the country is 22.3% (for comparison, 11.6% in 2019). [2]

From the very sad statistics, it follows that recently one can note a significant increase in the share of Internet fraud in the overall structure of registered acts of an unlawful nature on the territory of the Russian Federation. [3]

In addition to statistical aspects, sociological markers of this phenomenon are also extremely important. It is very important to note that not all victims of fraud, due to a number of objective and subjective circumstances, are inclined to file a crime complaint with the Ministry of Internal Affairs. Let us look at the most common ones. Firstly, people affected by cybercrime, according to experts, often do not contact the police because they take the blame upon themselves [4]. Secondly, taking into account the median damage from a remote type of fraud, which, according to data for 2018, amounted to 5 thousand rubles [5, p. 4], victims may not consider the lost funds significant enough to contact the police. Thirdly, there is an insufficient level of public trust in the activities of law enforcement agencies. Ultimately, this negatively affects the formation of attitudes towards interaction with the police in the event of a remote fraud case.

Based on the above, we can state that there is a need on the part of society for additional channels of protection and identification of emerging fraud practices in the Internet environment. It is especially important that they are preventive and prophylactic in nature. Of course, it is much easier to assess the situation after the fact, only by recording the crime and collateral damage. It is much harder, but also more effective, to work on preventing Internet fraud, although this is very difficult to do due to the continuously transforming forms of cyber fraud.

We see one of the most striking examples of the transformation of Internet crimes in the situation that arose during the presidential elections in Russia, taking place on March 15-17, 2024.

According to the Ministry of Internal Affairs, from March 15 to 17 of the presidential elections, 61 criminal cases were opened. Of these, 23 criminal cases were initiated due to deliberately false reports of mining, and 33 criminal cases - for damaging ballots with dyes. A total of 52 cases of carrying dyes to polling stations were recorded. In addition to criminal cases, 155 administrative protocols have also been drawn up, said First Deputy Head of the Russian Ministry of Internal Affairs Alexander Gorovoy. Experts note that almost all the suspects did this under the influence of unknown persons, manipulating them using the phone and

forcing them to record their actions on camera for reporting. Most suspects admit that in return they were promised to return money previously stolen from them or to write off non-existent loans that were allegedly opened in their name. Naturally, all these promises were manipulative in nature and were aimed at persuading the victim to behave as desired by the attacker. No one began to fulfill these promises and not intended to do so. [6]

We pay close attention to this point precisely because the scammers, trying to disrupt the presidential elections, were no longer guided by economic or social motives, but specifically by political motives. That is, they used deceived and blackmailed people to cause damage directly to the state and state institutions, and not to individual citizens. And they committed these actions not for the purpose of economic gain or manipulation of the victim's personal data (blackmail), but with the aim of destabilizing the situation in the country, sowing elements of panic and disrupting the elections. Naturally, these are already goals of a political nature. And this, by default, allows us to believe that fraud on the Internet now poses a significant threat to state security as a whole.

Without a doubt, this is just the first bell, a trial balloon. Moreover, if there is insufficient counteraction to this problem, in the future we may encounter a situation where this will have an element of the "new normal."

Today, the bulk of Russian society is almost entirely involved in the structure of the global virtual space, ranking 6th in terms of the number of Internet users (109 million people) according to the World Bank [7]. Thus, to maintain public safety in Russia, special attention should be paid to both scientific research and practical work in the field of research and suppression of Internet fraud practices, because the more people are involved in the online space system, the larger the target audience for the Internet scammers. In other words, each of the active users of the Internet space is theoretically a potential victim of fraudulent activities in the online environment.

Based on the results of the empirical part of the study, it was noted that among representatives of modern youth the practice of using the Internet is tightly integrated into their everyday life. This automatically makes them potential targets for fraudulent activities on the Internet. At the same time, the main online resource on which young people spend time is social networks, where they record the manifestations of Internet fraud to the greatest extent. Most likely, this may be due to the fact that in the course of illegal actions, fraudsters resort to social engineering practices, for the implementation of which it is very important to be able to communicate directly with the target of the fraudulent action. Not all existing practices of fraud on the Internet are well known to today's youth. In particular, it can be noted that less than half of the younger generation is aware of possible illegal actions by third parties in the field of Internet banking. All this indicates the need to

develop social projects in the field of educational courses on digital and financial literacy for the younger generation [8]. Of course, a lot is already being done in this direction. This includes training from educational institutions and banking organizations, but still every fourth young person, an active Internet user, “falls into the clutches” of Internet scammers. Frankly, these statistics are depressing. In addition, our task, as teachers of humanities, working within the framework of the Higher School and contributing to the formation of new elite of the Russian Federation, is to fully carry out activities aimed at preventing fraud as a phenomenon and creating “zero tolerance” for such actions in society.

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顿巴斯居民内心世界的价值特征和语义矛盾

## FEATURES OF VALUE AND SEMANTIC CONTRADICTIONS IN THE INTERNAL WORLD OF DONBASS RESIDENTS

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抽象的。本文致力于研究顿巴斯居民的社会文化价值观和意义。作者提出了自己的方法来识别不同人的语义结构内容的特殊性。对实验数据的分析可以发现受试者意义生活取向构成中的社会文化矛盾。

关键词：社会文化价值观和意义的范畴、个人二分结构、意义系统和生活取向。

**Abstract.** *The article is devoted to the study of sociocultural values and meanings of the residents of Donbass. The author proposes his own approach to identifying the peculiarities of the content of semantic structures of different people. Analysis of experimental data makes it possible to detect sociocultural contradictions in the composition of the meaning-life orientations of the subjects.*

**Keywords:** *Categories of sociocultural values and meanings, personal dichotomous construct, system of meaning and life orientations.*

The idea that the tragic events taking place in Ukraine are reflected in the value-semantic contradictions in the inner world of its inhabitants is inspired by the concept of the cultural and historical development of the human psyche, which was developed by L.S. from the 1925s until the end of his life. Vygotsky, and then his no less eminent students A.N. Leontyev, A.R. Luria, V.V. Davydov, V.P. Zinchenko and a number of others. Let us try to briefly highlight the main provisions of this concept, which will allow us to move on to presenting the main content of our work.

Firstly, this is the position that a person, in the process of his upbringing and education, being actively involved in this process, develops by mastering the culture of the society in which he lives. Secondly, the formation of the individual's inner world occurs through the internalization of his physical external activity. As a result, not only a figurative, but also a semantic, understandable model of the surrounding reality appears in consciousness.

If we apply these provisions to the population of Donbass, then we can assume that over the course of thirty years of “independent” life in Ukraine, when people had to master the meanings introduced by the ideologists of globalism about successful individualistic consumerism, the meanings of “exclusivity” and competition, which constantly collided with the transmitted the older generation with the meanings of service, conciliarity and philanthropy, it becomes clear that historical existence itself could then become a source of internal value-semantic conflict of people.

To test this hypothesis, we conducted a study of the value-semantic sphere of 278 adults (the average age of the sample was 29 years). In a number of the techniques we used, we applied the method of “Meaning-Life Orientations” (MLO) by J. Crumbo and L. Maholik, adapted by D.A. Leontyev [1, p.41], projective test of color relations (TCR, E.F. Bazhin and A.M. Etkind, 1985) [2, p.10-12], with concepts selected according to the purposes of our research, and developed we have a methodology for studying sociocultural values “My life credo” [3, p. 384-394], Let’s say a few words about the features of the selection of concepts in the central technical center. For the study, only categories were taken that had socially significant content and testified to the nature of the subject’s relationship to important components of the surrounding reality [4, p. 436-437]. As a result, all categories could be combined into a number of groups that have a special value and semantic meaning for human life in society. Let’s call these groups.

1. *Categories of traditional existential values and meanings*: family, health, mom, dad, child, boyfriend/girlfriend, attitude towards a person in general (respectful or derogatory), a number of important characteristics of communication with another person (cooperation, ability to listen and hear; power over people, managing them; various kinds of dependencies, etc.)
2. *The value of important types of activity, labor (physical and intellectual)*: knowledge of the essence in everything; activity in transferring knowledge, skills and abilities to other people; constructive, creative activity; my professional career; the desire to make everything around oneself beautiful, to harmonize; serving the cause of prosperity of the Motherland and people; fight for a just society.
3. *Categories of spiritual and moral values and meanings*: good, evil, honor and dignity of a person, freedom and responsibility, my conscience.
4. *Values of attitude towards oneself*: Myself, my typical mood, my past, present, future; the ability to manage one’s behavior to achieve one’s own plans, etc.
5. *Egocentric values of comfort and material wealth*: physical pleasures, comfort, all kinds of bodily pleasures and pleasures; increase in material assets (money, house, apartment, car, etc.)

6. *Generalized markers of modern sociocultural values:* the culture of modern Europe and the USA, the future of these regions; the mentality of Russians, their culture, language, history, the future of Russia.

For all selected categories, respondents in the TCR demonstrated the degree of their acceptance/non-acceptance; we correlated these choices with the ranked indicators of the “My Life Credo” methodology and the results obtained according to D.A. Leontyev.

Also using D. Kelly’s idea about personal dichotomous constructs that people use to structure their own sphere of meaning, we identified in our sample groups of respondents who demonstrated normative (“norm” group) or, on the contrary, “deformed” (“deformers” group) perception of one of the most ancient, spiritually important constructs for humanity, “good/evil” [5, p. 42-46.]. In the “norm” group, all subjects accepted “good” and rejected “evil”. In the “deformers” group, “good” and “evil” together were either accepted or rejected by respondents, or were perceived in the opposite modality: “evil” was accepted, “good” was rejected.

The entire data array separately for the two groups was subjected to quantitative and qualitative analysis, as well as the method of correlation analysis in nonparametric statistics using the Spearman coefficient. Let us show some of our results.

The distribution of respondents by group was as follows: the “norm” group – 136 people (51% of the entire sample), “deformers” – 119 people (42%). The remaining 23 people gave a vague attitude towards the poles of the dichotomy of the construct and were excluded from the study. Next, we decided to check the attitude of group respondents to sociocultural values, Table 1.

**Table 1.**  
*Attitudes to sociocultural values in the “norm” and “deformers” groups*

Value \ Groups	1 group	2 group
The mentality of Russians, their culture, language, the future of Russia	80 per./ 59%	59 per./ 50%
Culture, ideas of modern Europe, USA, future of these regions	63 per./46%	59 per./ 50%

As we can see, in the “norm” group there were more choices in favor of Russian culture, among the “deformers” the choices of sociocultural values were equally distributed.

It remained to find out whether these values are included in the structure of the meaning and life orientations of our subjects. For this purpose, we carried out a



correlation analysis of the connections between selected values by group with the scales of D. Leontiev’s MLO methodology, Table 2.

**Table 2.**  
*Correlations of sociocultural values by group with subscales of the “Meaning and Life Orientations” methodology by D.A. Leontyev*

Groups, Values  MLO subscales	Group «norm»		Group «deformers»	
	Russian mentality, culture, language, history, future of Russia	Culture, ideas of modern Europe, USA, their future	Russian mentality, culture, language, history, future of Russia	Culture, ideas of modern Europe, USA, their future
1. «Goals»	<b>0,277</b> at p < 0,01	-	- 0,239 at p < 0,01	<b>0,297</b> at p < 0,01
2. “Process”	-	-	-0,391 at p < 0,01	-
3. «Result»	-	-	- 0,361 at p < 0,01	-
4. “Locus control of the self”	<b>0,253</b> at p < 0,01	-	- 0,264 at p < 0,01	-
5. “Locus control life”	-	-	- 0,259 at p < 0,01	-
6. General indicator of life safety	-	-		<b>0,321</b> at p < 0,01

As is clear from Table 2, respondents from the “norm” group did not include the socioculture of Europe and the United States at all in the structure of their meaning and life guidelines. The values of Russian culture and its future also did not show correlations with all subscales of the SLS. But there are still positive correlations with the “Goals” and “Locus Control of Self” scales, which indicates that respondents include this value in their life goals and exercise control over themselves in the process of achieving them.

Thus, structuring a semantic model of the world with the normative use of the dichotomy of the personal construct “good/evil” allows people to more adequately navigate the sociocultures of our time and ultimately choose the values of their country. At the same time, these people also did not demonstrate a negative attitude towards the values of the cultures of Europe and the USA.

Let us now turn our attention to the group of “deformers”. Negative indicators of correlation between the choices of the subjects in the group and all scales of life-saving assessment indicate their absolute rejection of the values of Russian culture and the non-inclusion of these values into the system of meaning and life

orientations of these people. Quite high positive correlations of the sociocultural values of Europe and the USA of the respondents of the group only with the subscales “Goals” and “General indicator” of the MLO methodology indicate that, indeed, these people include the named values in the system of their meaning and life orientations, but these goals are for They are little realistic, largely projectorial, according to the interpretive conclusions of the authors of the methodology, since there are no correlations on all other scales, and the “Result” subscale also showed a large percentage of low average results for all those surveyed, which indicates dissatisfaction with their lives among many members of the group.

Next, it was decided to see whether the other categories, which we grouped according to the value-semantic principle, correlated with the MLO scales. In the “norm” group, only the value “my father” positively correlated with all MLO scales, and the values “my mother” and “serving the Motherland and one’s people” gave positive correlations with all scales, except for the “Result” scale. In addition, positive correlations with one or two subscales of the MLO, mainly with the “Result” and “Locus-control of the Self” scales, gave the following sociocultural value categories: “my responsibility for the actions and deeds”, “power and management of people”, “evidence conviction and unshakable faith in the correctness of certain ideas”, “physical pleasures”.

Thus, it can be stated that the structure of the meaning-life orientations of many representatives of the “norm” group includes predominantly traditional meanings and values; the subjects’ orientation towards parental attitudes and service to the Motherland and people is clearly expressed. It is interesting that, despite the small number of correlations with MLO scales, the subjects of this group as a whole showed a large percentage of positive choices of meanings and values in the categories of “important types of activity and work”, “attitude to the self” and even to a number of “spiritual and moral” meanings.” All these data indicate that people who normatively understand the dichotomous construct of “good/evil” structure the world quite adequately, creatively, with a pronounced humanistic orientation. Most of them are in harmony with themselves, with the people around them and the world. However, the presence of a number of alternative choices among a number of respondents, which contradict the general direction of the choices, coupled with a pronounced lack of self-acceptance (19 people / 14% of the group) indicates the presence in the inner world of a small part of the representatives of this group of a pronounced value-semantic conflict.

It is noteworthy that in the “deformers” group, not a single socially significant value that we identified gave positive correlations with the subscales of the MLO methodology. It turns out that for the majority of respondents in this group, the identified values are not included in their system of meaning and life orientations. At the same time, a number of values and meanings showed negative correla-

tions with the “Process” and “Result” scales, such as: “my mother”, “my husband (wife)”, “the ability to hear and understand another person, trust him”, “participate in building a just human society.” The values “service to my homeland and people”, “my career”, “my child” gave negative correlations with the “Process” scale, the value “respectful attitude towards a person” - with the “Result” scale, the value “work (physical and intellectual)” – with the “Locus control life” scale. As we see, important traditional and activity-significant meanings received a negative connotation in the system of meaning-life orientations of these people, both from the procedural and effective sides of their assessment of their own activity. There were also positive correlations in this group of respondents. Values such as “dependence on anything or anyone” and “money allows you to be the master of life, and the more of it, the better” were positively correlated with the subscales “Locus-control life” and “general indicator of life-sustaining life” (correlations are high, up to 0.429 at  $p < 0.001$ ). These data indicate that various kinds of dependencies and the desire for enrichment are actually included in the structure of the life of the subjects as fundamental. It should be noted that the percentage of those choosing these values as priorities was as follows: “addictions” (40% of choices), “money” (62% of choices). It is also important to say that, in general, the largest positive choices of these people concerned only two categories: “evil” (71% of elections), “power over people, managing them” (79%), and the smallest - “cooperation with other people” and “good” (39% each), “trust in one’s own capabilities and abilities” (42%), “study (work)”, “serving one’s Motherland and people”, “Russian culture, its future” (47% of elections each) . At the same time, 84 people showed a positive attitude towards themselves, 47 of them showed high self-esteem.

All these data indicate the presence of violations in the value-semantic sphere of representatives of this group, and that they are in a state of serious internal conflicts. These people are for the most part egocentric, aimed at enrichment and power over others, they are expressly aggressive, although perhaps this is simply their way of psychological protection from the destruction of their own self. Individual analysis of the choices of semantic categories by group subjects, as in the “My life credo” method , and according to the TCR, showed the presence of contradictions and illogicalities in their preferred values, which only confirmed the conclusions drawn.

It can be stated that different uses of the personal dichotomous construct allow people to structure meanings differently, model the world and look for their place in it. Identification of categories of sociocultural values in the inner world of a person and the imposition on them of a special form of structuring meanings by a given individual makes it possible to determine the degree of harmonization or violations in his value-semantic system. Thus, it was possible to discover the

main contradiction in the minds of the residents of Donbass between the values of family unity, creativity, humanistic orientation, service to the Motherland, the people and the desire for selfish comfort and a consumer, utilitarian existence. It seems that to an even greater extent this contradiction is corroding the souls of the citizens of Ukraine, spilling out, fertilizing the soil of the existing terrible conflict.

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DOI 10.34660/INF.2024.11.81.019

好奇心是情商的一种属性

## CURIOSITY AS A PROPERTY OF EMOTIONAL INTELLIGENCE

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抽象的。这篇文章致力于探讨好奇心作为情商的一种属性，以及它对将心理状态转化为认知过程的能力的影响。闲置的好奇心、好奇心激发的知识以及好奇心作为一种人格特质是有区别的。保持好奇心的一种方法是激活思维，并在较小程度上激活记忆，因为信息的积累会消除好奇心。研究表明，好奇心是个体的一种智力资源。值得注意的是，好奇心与寻找因果关系的愿望相关。好奇心是大脑对现实的物体和现象、它们之间的联系和关系形成关注的基础。好奇心本质上是智力性的，很有可能谈论好奇心的进化作用及其与人类搜索活动的联系。

关键词：好奇心、情绪、情商、人格资源。

**Abstract.** *The article is devoted to curiosity as a property of emotional intelligence, its influence on the ability to transform mental states into the process of cognition. Idle curiosity, curiosity-motivating knowledge, and curiosity as a personality trait are distinguished. One way to maintain curiosity is to activate thinking, and to a lesser extent, memory, since the accumulation of information extinguishes curiosity. It is shown that the emotion of curiosity is an intellectual resource of the individual. It is noted that curiosity is associated with the desire to find cause-and-effect relationships. Curiosity underlies the formation of the mind's focus on objects and phenomena of reality, connections and relationships between them. Curiosity is intellectual in essence and it is quite possible to talk about the evolutionary role of curiosity and its connection with human search activity.*

**Keywords:** *curiosity, emotions, emotional intelligence, personality resource.*

Both individual emotions and more complex integrative emotional structures play an important role in emotional intelligence. The development of emotional intelligence proceeds sequentially, from simple emotional forms of experiences to complex ones [1]. A person's natural desire to understand the life around him can cause certain manifestations of emotions, and the trigger mechanism is often a very specific emotion of curiosity.

Curiosity is one of the basic cognitive emotions that contribute to the fixation of consciousness on a certain object. Curiosity entails the emergence of a persistent interest in the world around us and the formation of an orientation of the mind towards certain objects and phenomena of reality, connections and relationships between them.

The emotion of curiosity is based on a lack of understanding at the current moment in time or a misunderstanding of cause-and-effect relationships, which can cause a whole range of complex emotional states. The following states are distinguished: idle curiosity and curiosity motivating knowledge, and curiosity as a stable personality trait.

The peculiarity of curiosity is its neutrality, the absence of positive or negative meaning, the benefits or uselessness/harmfulness are given by emotions or character traits combined with it [5]. In comparison with other cognitive emotions (interest and surprise), curiosity is distinguished by “childish” features, as well as a happy opportunity to quickly transfer the mental state to immersion in a task or situation. Curiosity can therefore be considered a “deep” emotion. The speed of curiosity may vary depending on the subsequent assessment of the object, phenomenon or situation. In any case, curiosity reduces possible discomfort and allows you to solve the problem of cognition in the shortest possible time, preventing personal resistance in the form of laziness or other mental imperfections [3].

Curiosity ties attention to an object, and can cause discomfort and even rejection in others due to a certain obsession, impertinence, and incorrectness in social relationships. Symmetrical attention to a curious person arises, since curiosity, like any emotion, is contagious. Socialization can influence the transformation of curiosity to the point of indifference and loss of interest in objects that previously occupied the mind. A sociocultural mechanism for suppressing excessive curiosity in social relationships has been developed. In social relations, an important argument for suppressing curiosity is the denial of the usefulness of an object, so people have to make additional volitional efforts to maintain persistent attention to it. Some people manage to maintain natural curiosity as a constant trait. One way to maintain curiosity is to activate thinking, and to a lesser extent, memory, since the accumulation of information extinguishes curiosity.

When considering the consequences of curiosity, the dynamism of the mental state and personality development under the influence of this emotion becomes obvious. Both character traits - determination and curiosity, as well as the creative abilities of the individual can develop.

As curiosity is experienced, the prognosis is initially unclear, so this emotion can be considered processual, exploratory rather than trace forming, however, attempts to construct an emotional prognosis may take place [2]. The result of cognition can subsequently either please or disappoint, which is a common characteristic of various emotions [4]. The dynamism of mental states when experiencing curiosity indicates personality changes.

Curiosity anticipates the development of a person's creative potential. Combined with determination, it plunges you into the depths of knowledge of the world and contributes to the development of mastery in almost any activity. Becoming a stable trait, curiosity forms an important structural element of emotional intelligence, motivating to perform the activity of interest to perfection. Curiosity contributes to the continuation of complex, time-consuming work; when intellectual challenges arise, the lack of curiosity becomes the reason for avoiding responsibility.

Curiosity accelerates the development of emotional intelligence, causing other forms of emotional assessment of objects and phenomena of the surrounding world as we learn.

Thus, it is possible to consider curiosity as an intellectual resource of the individual, which increases the creative potential of the individual and speeds up problem solving. Curiosity encourages us to look for the most complete answers to questions that are familiar at first glance, to establish non-standard connections between objects and phenomena, and to come up with original ways to solve problems.

The positive function of curiosity lies in its ability to transform mental states into the process of cognition. Curiosity is intellectual in essence and it is quite possible to talk about the evolutionary role of curiosity and its connection with human search activity.

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克里米亚战争前俄罗斯帝国海军改革的准备工作

**PREPARATION OF REFORMS OF THE RUSSIAN EMPIRE NAVY  
BEFORE THE CRIMEAN WAR**

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抽象的。在文章中,根据首先介绍科学交接的档案文件,实现俄罗斯帝国和海军部领导的过程以及十九世纪五十年代初期俄罗斯海军改革的必要性 被认为。作者指出,改革的发起者是海军上将康斯坦丁·尼古拉耶维奇大公。文章展示了康斯坦丁·尼古拉耶维奇在克里米亚战争前对舰队状况和变革发展的详细研究中的作用。作者还处理了海军专家应海军上将的要求提出的关于舰队改革的建议,并指出当时大多数海军上将并没有意识到俄罗斯舰队全面落后于俄罗斯舰队的的事实。主要海洋国家。本文使用了俄罗斯国家海军档案馆第 224 号基金“康斯坦丁·尼古拉耶维奇大公,海军上将(1827-1892 年)”的文件。

关键词: 海军、尼古拉一世、康斯坦丁·尼古拉耶维奇大公、改革。

**Abstract.** *In the article, on the basis of archival documents first introduced into the scientific turnover, the process of realizing the leadership of the Russian Empire and the Navy Department of the need for reforms in the Russian Navy in the early 50-ies of the XIX century is considered. The author notes that the initiator of the beginning of the reforms is Admiral General Duke Konstantin Nikolayevich. Article shows the role of Konstantin Nikolaevich in the detailed study of the state of the fleet and the development of transformations before the Crimean War. The author also process the proposals of naval experts, made at the request of the Admiral-General, for reforming the fleet and states the fact that the majority of admirals at that time did not realize the comprehensiveness of the Russian fleet's lagging behind the fleets of the leading maritime nations. The documents of the Russian State Naval Archive, fund 224 "Konstantin Nikolaevich, Grand Duke, Admiral General (1827-1892)" were used in this article.*

**Keywords:** *Navy, Nicholas I, Grand Duke Konstantin Nikolaevich, reforms.*



Most researchers of the reign of Nicholas I note that this period was characterized by extreme conservatism and reactionary spirit. Nikolai Pavlovich was convinced of the harmfulness of any reform processes and considered the salvation of the country in conservatism and strengthening of the absolutism.

In the army and navy in his reign was impeccable external order, but emperor was less interested in the technical equipment of new weapons. The small number of high-tech weapons that were available in the army and navy were purchased abroad, but despite this, their production in Russia was either not patched up at all, or production was established on a very limited scale and of lower quality (for example, the construction of steamships). The development of armaments and military equipment took place substantially on the enthusiasm of military engineers. First Sea Lord Prince A.S. Menshikov for two decades in his all-subject reports reported on the well-being of the fleet, praised the existing order and listed the favors shown by the Emperor when visiting the fleet. At the same time, Menshikov did not raise the issues of rearmament and reform of the fleet at all, while the fleets and armies of Britain and France made a serious technological leap.

In the first decade of his reign, Nicholas did much to put the fleet in order, and in 1836 he held a review of the Baltic Fleet, at which he presented the fleet to Peter's I boat - "the grandfather of the Russian fleet". He showed that the precepts of Peter the Great as the founder of the regular fleet fulfilled and the following almost two decades before the Crimean War the fleet was maintained in this state, but did not change technologically. This resulted in technological lagging behind the leading maritime nations by decades.

According to the results of the Crimean War Nicholas I was often accused that the fleet was not ready for war, was worn-out and obsolete and was unable to resist the fleets of England and France. Without denying Nikolai's guilt, it is necessary to note the fact that a certain understanding of the need for reforms at the top naval leadership was already formed in the early 50's. It was at this time that Grand Duke Konstantin Nikolaevich came to the actual leadership of the fleet.

It should be noted that Nicholas I began to prepare his son to lead the Russian Navy from early childhood. At the age of four, Konstantin Nikolayevich became an admiral general. Admiral F.P.Litke, an outstanding navigator, was appointed as his tutor. From the age of 16 the Grand Duke practiced on warships. At the age of 21 he was promoted to Rear Admiral and appointed Chief of the Sea Cadet Corps. Since September 1850, he chairs the committee to revise and supplement the general set of naval regulations, from June 1852, by decree of the Emperor, he was appointed Comrade Chief of the Admiralty Naval Staff.

Having familiarized himself with the affairs of the Navy Department, Konstantin Nikolayevich, sends to the places a demand to provide complete and objective information about the state of the fleet. The Admiral General demanded that of-

ficials in their reports to apprise on shortcomings and deficiencies, to express their proposals to improve the state of the fleet. Konstantin Nikolaevich wrote: “I will be especially exacting on not showing disorder and will not allow any praise. We need facts, not phrases, to praise us.” [2].

Full information was given to the young Admiral General. Historian of the Navy Belavenets P.I. wrote that in 1853 Konstantin Nikolaevich found it possible to say the sad truth that “the material forces of our fleet, much inferior to the qualities of their fleets of foreign fleets. The quality of wood, construction, lack of propeller engines, less speed, tackle gear, artillery, ammunition, all kinds of hand weapons and so on are the subjects in which we can not compete with the fleets of the British, French and American” [1]. This raised the issue of fleet reform. Konstantin Nikolayevich did not create official structures for the preparation of the reform, but demanded new proposals for the development of the navy be submitted to the most authoritative specialists in various fields of maritime administration. For example, Vice-Admiral V.I.Melikhov, Rear Admiral F.S.Lutkovsky and a number of other naval officials were ordered to submit new proposals. The proposals received were carefully studied and systematized by Konstantin Nikolaevich personally. The development of a plan for future reforms began, but the outbreak of the Crimean War made serious adjustments to these plans.

The measures that were planned to be taken to rebuild the fleet involved the following major actions.

In particular, it was supposed to unite in the Naval Council on the model of the Military Council of the Admiralty Council, the General-Auditorate, the Academic Committee and the Hydrographic Depot, and to abolish the General-Intendentorship [3, P.1-2].

For the first time, the question of the subordination structure of the fleets was raised, which was completely inadequate to the existing conditions. Thus, in the Baltic Fleet there was practically no fleet management link. Division commanders had no immediate superior over them and reported directly to the Chief of the Admiralty Naval Staff. The port commanders-in-chief were also not superiors to the naval divisions, but directed only their harbor service. This led to the fact that the constituent parts of the same fleet could be governed by different rules. As a result, the question of introducing the post of Commander-in-Chief of the Baltic Fleet was raised [3, P.21].

No less raised was the resolution of the problem of subordination of the Black Sea Fleet, which was practically autonomous and not subordinated to the maritime administration bodies. As a result, the Black Sea Fleet duplicated practically all management bodies, and the commander-in-chief was assigned a large number of additional “unrelated” duties. In addition, the Department of the Maritime Ministry dealt only with the Baltic Fleet and had absolutely no information about

the state of the Black Sea Fleet [3, P.4]. All this led to large expenditures of the treasury, diversion of the fleet from combat training, additional burden on the commander-in-chief and excessive use of officials.

Melikhov proposed to do the order of subordination within the Black Sea Fleet as in the army: crew commanders are subordinate to brigade commanders, brigade commanders to division commanders, and division commanders to the commander-in-chief (as a separate corps commander). Melikhov also proposed to abolish the Black Sea Fleet auditorate.

Very important from the point of view of the Black Sea Fleet functioning the question was raised by the Chief of the Fleet Staff Rear Admiral V.A.Kornilov. It was a issue of moving the Black Sea Fleet headquarters from Nikolaev to Sevastopol (an idea that was expressed by Admiral M.P.Lazarev, but which was not put into practice due to lack of finances). The obvious benefits of this transformation could be the proximity of management to the fleet, the reduction of the Sevastopol port commander, his staff and other duplicated management structures, as well as closer and more convenient delivery of cargo for the Black Sea Fleet from the Don through the Sea of Azov [3, P.27].

On the issue of improving the organizational and staff structure of the fleets, Melikhov expressed the opinion that the number of flagships in the fleet was excessive. Thus, in the Baltic Fleet of 27 line ships 13 went under admiral's flags, this led to increased expenditures of the treasury and reduced the role of commanders. Melikhov also expressed the opinion that such a compound as a brigade is useless for the navy, because in its functions it almost completely copies a division [3, P.4]. Lutkovsky pointed out the need to introduce the posts of executive officers in squadrons [3, P.19].

The experts were unanimous in pointing out the need to bring together all existing maritime regulations. This is not the first time this issue has been raised in the maritime department. So back in 1830 it was ordered by the highest command to compile a set of laws for land and sea departments, as a result, the land department compiled a statute roll 10 years later. In the maritime department, the work on the creation of a set of maritime laws was entrusted to the Fleet Marine Force Organization, but after two decades it did not even begin to do it [3, P.29-30]. This once again shows the low efficiency of this structure, as well as weak control by Nikolai Pavlovich over the execution of his commands.

It is interesting that both Melikhov and Lutkovsky in one voice proposed to destroy the corps of navigators in the fleet, and their duties to be entrusted to naval officers. As a justification, it was suggested that there is a violation of subordination - the navigator gives instructions to the commander of the ship, while the commander on the ship is in fact the first navigator. At the same time, the low level of training of navigators in the Naval Cadet Corps and the necessity of their additional training in the Navy are pointed out [3, P.3-4].

One of the important aspects pointed out by the admirals was the deplorable situation of the Izhora and Shirshen (Arkhangelsk) factories. These factories could hardly fulfill the most necessary orders of the fleet, and their development and modernization were out of the question. As a result, the maritime department was forced to purchase most of the machinery to equip steamships abroad. It was also pointed out that there was a complete absence of an engineering training system. By the middle of the XIX century the situation in this sphere became simply catastrophic - for two decades not a single engineer was trained at the factories.

In addition, a number of proposals provided for the re-subordination of the marine construction part to the fleet [3, P.5], the transfer of ship scaffolding to the Ministry of State Property [3, P.6], and the proper arrangement of admiralty buildings. It was proposed to deepen the harbors of Kronstadt, as ships could already be loaded only at the road. One of the most pressing issues raised was the replenishment of all types of inventories [3, P.7-8].

It was proposed to introduce new staffs for all services of the fleet and to introduce a new method of recruiting the lower ranks. In particular, Melikhov proposed to recruit draftees for the fleet from fishing villages, referring to the experience of England and France. In his opinion, it was necessary to introduce a “naval record”, that is to assign draftees to the naval department by province (Baltic Fleet - Arkhangelsk, Olonets, St. Petersburg, Novgorod, Kostroma provinces; Black Sea Fleet - Saratov, Taurida, Kherson; Caspian Flotilla - Astrakhan province) [3, P.31-32].

All the advisers pointed out to Konstantin Nikolaevich the insufficiency of the maintenance of the fleet employees, especially naval officers. Thus, Lutkovsky in his report wrote: “All ranks serving in the Liner Naval Service receive a content so poor that they can barely support their existence and then only fall into debt. The brigade major has no fortune of his own, unable to get a horse despite his advanced years, walks through snowdrifts on foot in bad weather.” [3, P.17]

Melikhov proposed a transformation of lighthouse management. For this purpose it was supposed to divide the lighthouses and hydrographic marks of the Gulf of Finland into two districts - Kronshtadt and Revels, and to entrust their management to the chiefs of navigators in these ports. The same persons of the Arkhangelsk and Astrakhan ports were supposed to be in charge of the lighthouses of the White and Caspian seas, and the general management of lighthouses was to be entrusted to the Director of the Hydrographic Department [3, P.20].

Fleet General-staff-doctor Mend in his report pointed out the lack of doctors in the fleet and the imperfection of the decree on marine medics from December 16, 1848. He wrote about the need to reform hospitals and improve surgeons [3, P.27-28].

A number of lesser proposals were submitted, such as improvements on the executive offices, the abolition of uniform in the navy, etc. All proposals were

scrutinized by Konstantin Nikolayevich, some that caused him doubts were passed to other experts with a request to express their opinion.

Analyzing the essence of the proposals submitted by the admirals on the proposed transformations it should be noted that for the most part the proposals were superficial and did not address the underlying problems that had been accumulating for a long time and by the middle of the XIX century led the Russian Navy to a critical state. For example, none of the experts expressed an opinion on the need for a complete rearmament of the fleet, starting with rifles and pistols and ending with screw ships.

Interesting fact, despite the fact that Konstantin Nikolayevich himself noted the incongruous number of officials in the number of combat formations, almost all experts suggested that new officials should be introduced in one sphere or another. This shows that the entire fleet leadership did not realize that the system itself needed to be changed and felt it was sufficient to only offer ideas to improve the functioning of the existing system.

It should be noted that neither Nicholas I, nor Prince A.S. Menshikov, nor the highest officials of the navy before the Crimean War had any understanding of the extent to which the army and navy were technologically lagging behind the leading naval nations. In other words, we can say that Russia missed the technological leap that took place in Europe. At a time when the leading European countries were massively building screw ships, Russia was spending huge sums of money on building a sailing fleet. The Allies came to Crimea with a whole fleet of screw ships, while the Black Sea Fleet did not have a single screw ship.

Despite the fact that Nicholas I throughout his reign was interested in the development and construction of steam ships abroad, but the Russian Navy until the Crimean War, steam ships were used only as auxiliaries. Perhaps he misjudged the capabilities of the leading naval powers to rearm their fleets, and believed that the transition to a steam fleet is an event of the distant future, while rearmament was in full swing.

In February 1855, the Emperor wrote to Prince A.S. Menshikov: “I regret very much that we have not yet supplied a single ship with a screw; it would be very timely, and I do not suppose that it would be difficult either. Прошу мне представить ваши соображения безотлагательно.» [2]. But it was too late. Russia had already suffered huge losses in the war, and Menshikov’s reply apparently no longer caught Nikolai Pavlovich alive.

Thus, we can state the fact that the understanding of the need to reform the fleet appeared at the leadership of the Navy in the early 50s of the XIX century. The rearmament of the fleet was extremely important. The transition to new types of weapons requires a fundamental change in the entire fleet organization, reformatting of all structures, i.e. the actual creation of the fleet anew. At the same time it

should be noted that neither the Emperor nor the leadership of the fleet before the famous statement of Konstantin Nikolaevich in 1853 did not have an understanding of the depth of the necessary transformations. They realized it too late, and the development and implementation of reforms was hindered by the outbreak of the Crimean War, as a result of which the fleet actually had to be created anew.

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DOI 10.34660/INF.2024.64.62.021

格林卡在不断变化的世界艺术背景下的天才  
**GLINKA'S GENIUS IN THE CONTEXT OF THE CHANGING  
WORLD ART**

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抽象的。 本文专门介绍俄罗斯作曲家米哈伊尔·格林卡的风格细节，他的才华的绽放取决于他伟大时代的成就。 在当前历史和文化变迁的时代，在许多方面与当时相似，格林卡艺术的包容性（他知道如何结合不同文化的潮流，特别是俄罗斯和东方）脱颖而出，其重要性 文章证实了这种品质在现代艺术世界中尤其有价值。

关键词：民间传说、风格化、宽容、民族观念、历史和爱国歌剧、俄罗斯美声唱法。

**Abstract.** *The article is devoted to the specifics of the style of the Russian composer Mikhail Glinka, the flowering of whose talent was determined by the achievements of his great era. At the present time of historical and cultural changes, in many ways parallel to that time, the tolerance of Glinka's art (who knew how to combine the currents of different cultures, especially Russia and the East) comes to the fore, the importance of which is substantiated in the article as a quality that is especially valuable in modern art world.*

**Keywords:** *folklore, stylization, tolerance, national idea, historical and patriotic opera, Russian bel canto.*

*“First the grievous sorrow, and then the hymn of redemption, so proud and triumphant that the last peasant transferred from from his hut to the theater, I would be touched to the depths of my soul”  
(Henri Mérimée on “A Life for the Tsar”, 1840)<sup>1</sup>*

These enthusiastic lines were written by a Frenchman, a famous music critic, cousin of the famous Prosper Merimee and an approximate contemporary of M.I. Glinka, who lived in Russia for about a year and knew the composer's first opera well. Not only in it, but in the entire history of the great times of national unity,

victory over Napoleon, awareness of inexhaustible spiritual and physical strength, there was sorrow, loss, pride, and the triumph of bell ringing, powerfully echoing in the soul of every Russian. That same belle France, which was imitated in exorbitant admiration by the Frenchized Russian nobility, who spoke and wrote in a foreign language, applauding the ballets of C. Didelot, the vocal art of the stars of the troupe F.A. Boualdieu and the “rescue operas” of A. Grétry and N. Dalleyrak. Later, in the 1840s, who admired the “precious originality” of Glinka’s style?<sup>2</sup> In response to his compositions, performed at the Paris concert, who wrote the “extremely nice article”, among other praisers, not to mention Hector Berlioz, who burst out with a large biographical essay “Michel Glinka” in the *Journal des Debats*?<sup>3</sup> The French, the French... defeated this time not by bayonets and cannons, but by music. The great era that elevated Russia put forward its heralds. A nation that realized its power needed a strong, booming voice, a big touch, and deep ideas. The time of military triumphs also sought victories in art. Glinka’s musical gift, without a doubt, would have yielded different results had the composer been born half a century earlier and in a different social class; most likely, he would have repeated the fate of his talented predecessors, from Evstigney Fomin to Dmitry Bortnyansky. Could it be otherwise if the pre-Napoleonic 18th century in Russian history offered Russians a single scenario of “musical stories” that developed something like this:

- a gifted boy who grew up in a remote province (much less often in large cities) with far from wealthy parents;
- a sonorous children’s treble that delighted the regent and delighted the parishioners; excellent rhythm and hearing;
- a happy accident that gave me training in St. Petersburg and a meeting with the famous maestro, certainly Italian;
- a very hopeful turn of events associated with the appointment of a scholarship (for outstanding achievements - “others are not a model!”) and departure for an internship in Europe, most likely, again in Italy;
- good luck abroad, opera premieres, attention from the musical environment, awards and titles, up to membership in the famous Bologna Academy of Music; the desire, with commendable zeal, to learn to write indistinguishably from the Italians (French, Austrians, etc.);
- expiration of the period of stay abroad (as a rule, a considerable one - from three to four to ten years) and return to Russia; a test assigned by the highest persons - to compose such and such a scene in an opera, or even an entire opera according to the proposed libretto;
- an unchanged (and quite understandable) verdict regarding the fact that natural Italians (French, Austrians), the whole flower of Western art that was collected at that time at the Russian court, are still better than “fake” Italians;



- assignment to a modest service (after all, a lot of money was invested in training!), sometimes invented by zealous officials and not really existing at all - in the manner of “Potemkin villages”;

- staying, sometimes for many years, on the outskirts of the musical world, natural disappointment, material instability instead of success, manuscripts instead of publications, illness, and often premature death...

This would probably have been Glinka's path had he lived during Catherine's period. But even at the turn of the century, on the eve of the era of victories, the noble and wealthy landowner Glinka was unlikely to be able to see his life purpose in art (unlike literature, music in the times of serf theaters and serf chapels was considered a non-noble profession), and would he have signed his opuses as one of his noble contemporaries: “Osip Kozlovsky, amateur,” emphasizing his status: amateur, nothing more.<sup>4</sup> And Glinka would have chosen the title for the collection of his romances to be similar to the one published by Catherine's dignitary Grigory Teplov - “Idleness in the meantime”: so, a useless pastime...<sup>5</sup> It is not surprising that the nobleman I.N. Glinka (the future father of the composer), who was born shortly before his death, subsequently spoke sarcastically about the well-known family legend concerning his brilliant son: “It was not for nothing that the nightingale sang at his birth at the window, so the buffoon came out”... and Ivan Glinka was “a naturally intelligent and at that time a very educated person,” according to the definition of M.I. Glinka's younger sister, Lyudmila Ivanovna Shestakova.<sup>6</sup> The new time that her brother found was completely different, and its sharp turn had already taken place. The era made Glinka, but it did not allow him to play tricks; and he himself least of all strived for this.

“Sometimes the question just worries me to the point of nightmare... how, having been a colorless amateur for a long time, Glinka suddenly, in one step, became alongside (yes! alongside!) Mozart, Beethoven and anyone else. This can be said without any exaggeration about the man who created “Glory!”, recalled P.I. Tchaikovsky.<sup>7</sup> Glinka's miracle... His contemporaries wrote about this with delight, among the first - Vladimir Odoevsky, Alexander Serov, Nikolai Melgunov, Vladimir Stasov (not to mention the writers, from Pushkin to Zhukovsky and Vyazemsky), wondering: how did it happen that on the meager musical soil of the previous centuries and decades, the “luxurious flower” of new Russian music blossomed (Odoevsky's metaphor), which suddenly rose on a par with, and in some ways higher than, the famous European schools? And why, before Glinka, Russia was indeed an eternal and hopeless musical province, where bold talents were not born; and if they were born, they quickly became scarce... But what is especially noteworthy: future generations were also surprised by Glinka's phenomenon; this abyss has always been heard. Maxim Gorky also called the composer “the wizard Glinka,” and the same is certainly true now. An original, quite shocking judgment

that Russian music, unlike all other national schools, has its own date of birth (November 27, 1836 - the day of the premiere of "A Life for the Tsar") and place of birth (St. Petersburg, Kamenny Theater) flashes to today days - in scientific and popular literature. To confirm the notorious thesis that "Russian music begins with Glinka", verbal discussions are not required in the twenty-first century.

The "luxurious flower" blossomed, however, not from scratch, but from the black soil plowed by the hardworking musicians of the previous era; and even deeper - on the primordial ancient layers and "earth crust" of folklore. Perhaps the secular music of Glinka's predecessors was imitative, but the church's musical heritage remained truly valuable: there are true masterpieces in the music of Dmi-try Bortnyansky and Maxim Berezovsky, whose concert "Do not reject me in my old age" is perhaps the best that was born of Russian musical art before Glinka. The outlet on the difficult path of those musicians who were born in the early and middle of the 18th century was precisely the sacred genre, especially the one- and two-choir concerta cappella. Without a doubt, its echoes, its fervor, and very noticeable ones, are heard in the choral scenes of Glinka's operas. It is no coincidence that the initial author's plan for «Susanin» envisaged not an opera, but a stage oratorio, and the unconditional culmination of both versions was supposed to be a choral epilogue. Another source, the original one in Glinka's life, was determined not only by his childhood in the conditions of a provincial landowner's life, saturated with soulful peasant songs and playful dance tunes. Russian musicians of the end of the 18th century, composers of early comic operas, on the direct instructions of noble librettists, took as musical material for solo numbers certain folk songs from folklore collections actively published in Catherine's times - and, as a rule, added little to them. A simple man or an enlightened gentleman who spent the winter abroad and the summer in his estate, both loved the folk tune with their souls; That's why the simple-minded vaudeville operas of Mikhail Sokolovsky or Vasily Pashkevich enjoyed such success in different social strata. Glinka's older contemporaries, musicians of Pushkin's time, followed the same path. The charm of the Russian song - the favorite genre of Alexander Varlamov («Red Sundress», for example, foreign guest performers considered a genuine folk melody), the image of a «Venetian» peasant girl in the romances of Alexander Gurilev, Russian antiquity and the pronounced national flavor of «Askold's Grave» by Alexei Verstovskiy, firmly standing on the position of colloquial Russian opera, as opposed to the "Italianized" "A Life for the Tsar," which was completely musical... A sharp tilt towards folk songs meant not only the search for a democratic language, and with it success with the public; it was natural in an era permeated with patriotism, the music of which could no longer be the same, marking the end of the imitative era. At the same time, the general intimate touch and limited scale made this period more of a springboard than a full-fledged prologue in the history of the Russian

Golden Age. Even in the names and definition of the genre, the domestic musical theater, the main arena of new art, gave in to the European stage:

- E. Fomin did not dare to call his “Coachmen on a Stand” (1787) an opera (labeling it as “a game by chance”), although it is remarkable for its beautiful choral numbers based on folklore material;

- A. Verstovsky called his numerous works in this genre, totaling over thirty, operas-vaudevilles (or comedies-vaudevilles); and in one of the best operas - “Vadim” (1832) - he assigned the main role, purely speech, to a dramatic actor;

- and here is the proud name of “an original grand opera in three acts with an epilogue, choirs and dances,” as was stated on the premiere poster of “A Life for the Tsar”: the original European genre, Russian history and native musical language came together. Those who who was lucky enough to welcome the birth of Russian opera classics.

A. Serov, who was at the second performance of “Life for the Tsar” (at that time a sixteen-year-old youth), noted “the similarity of the style of this music with our folk songs... the music is both folk and non-folk - very learned, complex forms flash.”<sup>8</sup> “Happy is the composer,” added A. Ulybyshev, “who has the opportunity to use the folk melodies at his disposal when developing such a libretto! Because here the music of Mozart himself could not replace them”...after all, the meaning of the new opera and “its purpose is to evoke in the public the same feelings that inflamed us at the patriotic performances of the 13th and 14th years!”<sup>9</sup> In the mentioned years, as it seemed quite stable, Glinka stood in the same positions as his predecessors, starting his path to music in the old fashioned way, by going through the already mentioned steps: home music playing, piano success, private lessons from the “Russian Irishman” John Field, and behind him three of his students; appearance in St. Petersburg salons, praise for the owner of a pleasant voice and a lively piano player - and Glinka’s age was already approaching her 25th birthday, the first romances composed, the decision to leave for Europe - to improve his health and continue his musical education. Three years in Italy (where Glinka was lucky enough to hear outstanding masters of bel canto and learn from famous maestri) and about a year in Vienna and Berlin (theory lessons from Z. Dehn). At this point, however, the movement along the musical ladder known to Glinka’s predecessors ended. From the outside, the return to the homeland was determined by the illness and death of his father; with the essence - growing dissatisfaction in creativity. Glinka could have returned to Europe, but did not; he came to Russia different, completely different - a musician and a person. “All the plays I wrote to please Milan, published very neatly by Giovanni Ricordi, convinced me only that I was not following my own path and that I sincerely could not be an Italian... in the spring and first half of the summer of 1833... I did not write, but a lot thought.» (M. Glinka. Notes).<sup>10</sup>

With all the splendor of the flowering of Western romanticism in the same 1830s, Europe of that time did not know such an attraction to ethos in art, to big, fateful ideas, to conceptualism and heroism, as Russia, which was developing in parallel. The music of the victorious era could not, like the previous age of classicism, “murmur” with the silvery passages of the harpsichord, listen to the variety and sophistication of melismas, rejoice in the simplicity and prettiness of home, salon genres, or applaud simple operatic comedies. The beaded Italian style and sensitive arioso, graceful eroticism and endless dressing up in sparkling, light-footed buffa were dissonant with the spiritual demands of the great time. The miniature as the main genre of European early and middle romanticism did not coincide with the broad, confident step of Russia during the heroic era. Confessionalism, intimacy, and first-person narration did not fit with the role of the speaker-tribune - playwright, conductor, composer. Concert and stage oratorio, patriotic cantata, multi-act opera, historical subjects and solemn finales - this is what was valued above all in Russian art of those years.

Summing up the results of her stay abroad, Glinka notes her successes on the performing path, mastering the specifics of vocal writing, and the growth of theoretical knowledge. “I consider my composition classes less successful,” Glinka adds to what has been said.<sup>11</sup> “It took me a lot of work to imitate the Italian *sentimento brillante*, as they call the feeling of well-being, which is a consequence of an organism happily arranged under the influence of the beneficent southern sun,” Glinka recalled. “We, residents of the North, feel differently, impressions either do not touch us at all, or sink deep into the soul...Love, this delightful feeling that gives life to the universe, is always associated with sadness for us.”<sup>12</sup> Going from the opposite, cutting off what seemed inconsonant with either time or himself, the composer found that very Russian *bel canto*, which, combining the Italian cantilena and the unique beauty of the Russian drawn-out song, formed the basis of his operatic style. He made fine jewelry deeply moral and extremely serious. Glinka was born at the right time in the right place. Strong musical soil, prepared by trained professionals, and most of all, by extremely gifted people themselves. The pedestal of the turning point in Russian history that elevated Glinka. His unchanging credo. Do not imitate - like the generations of the previous century. Do not reject it - like the contemporaries of Pushkin’s time, in the deep conviction that it is necessary to dissociate ourselves from Western art completely (otherwise it will be absorbed without a trace). To connect - the original and the new, someone else’s and one’s own, folklore and professional. Without the goal of entertaining anyone or pleasing anyone: Russian music of the Golden Age was not biased and almost never commissioned. Glinka returned to Russia with the firm intention of writing professionally, with a goal, fully armed with musical knowledge, but definitely in Russian. The Western world “not only put my knowledge in order,”

Glinka recalled, “but also ideas about art in general... I began to work not by touch, but with consciousness.”<sup>13</sup> “The idea of national music (not to mention operatic music) became more and more clear...”<sup>14</sup>

Several lines merged into one, and the understanding of the national Russian and its root basis clearly emerged both in themes and images, and in the selection of musical material. The era of romanticism, which coincided in the early stages with Glinka’s youth, added to the attention to local color and folk genres characteristic of this style. The main thing, however, was something else. In musicology there are the terms “absolute and relative pitch”, “color pitch”, “timbre pitch”, but there is also a special gift for recognizing the national essence and affiliation of music - it allows, once hearing an Indian tune or a tune in the Chinese pentatonic system, to create a European, who never left the borders of his country, for example, “Song of the Indian Guest” or the piano miniature “Pagoda”. Glinka also had such a “folklore ear” by nature. The composer’s rare gift was especially important in the formation of classical music of his multinational Fatherland. Tolerance, essential in the life of ethnically diverse Russia, was achieved in its art earlier, simpler and more natural than in the world of politics, social relations and religious beliefs. The unity of a diverse nation, realized by society during the Napoleonic wars, found a direct and surprisingly organic reflection in Glinka’s music - for the first time so convincingly in Russian art. In contrast to the “narrowly Russian-oriented” works of his immediate predecessors, who were convinced of the correctness of their path, the national flavor of Glinka’s opuses is multicolored: it is composed of a leading Slavic principle, a widely represented, diverse East, Finnish and Polish roots, Circassian dances and Georgian Lezginka .

The musical East, which was very attractive to Glinka, remained a rich source of borrowings, especially from the 1840s. “There is no doubt that our Russian mournful song is a child of the North, and perhaps it was somewhat transmitted to us by the inhabitants of the East” ... “Listen to the Volga cab driver - the song is mournful, you can hear the dominion of the Tatars; - they sang, - they sing, that’s enough!<sup>15</sup> The Eastern principle in Russian music was very noticeable in any era - whether it was Byzantine times or the turn towards Western Europe. The very territorial location of the country, geographical and historical reasons led to the fact that Russia, occupying an intermediate position between East and West, tilted in one direction or the other in the spiritual aspect. But even in those days when Russia, in relation to musical art, was one of the branches of the artistic culture of Europe, it always retained within itself the embryo of the East: just remember the oriental romances of Russian classical composers, exotic ballet and opera scenes, the symphonic picture “In Central Asia” A. Borodin or N. Rimsky-Korsakov’s “Scheherazade” suite, an actively developed theme of the East in Soviet and post-Soviet music. Russian music (and Glinka’s work) in its touch on

the Eastern world is much broader than the country itself, connecting two continents: remember the dance suite in the Chernomor gardens with its Turkish and Arabic dance, the Persian choir, and with them the Moorish chant (punto moruno) in one of the Spanish overtures; "...their songs are also mournful, even of happy Andalusia," which is largely understandable to Russia thanks to the performing practice of the gypsies.

Feeling the roots of folklore in full force, "some of the aristocrats, speaking about my opera," Glinka noted about "A Life for the Tsar," expressed themselves with contempt: "C'est la musique des cochers."<sup>16</sup> Indeed, this was how it was, and often, in the theatrical music of his predecessors: the national-Russian principle was then associated with the peasantry and rural life. Glinka's style, which has no analogues in Russian art of that time, combined in an organic unity the rural folklore basis and subtle St. Petersburg aristocracy: the tolerance of his writing turned out to be not only horizontal, geographical, but also vertical - socio-historical. It was this quality that formed the basis of the "Glinka miracle," ensuring the rapid rise of Russian music and its influence on the artistic world. "Lapotnaya Russia" would never have ranked among the leading music schools in Europe.

The opinion has long been known that the Golden Age of Russian music is being built behind Glinka; From an artistic point of view, this is exactly the case. On the stylistic side, the Mighty Handful, and in many ways Tchaikovsky, followed Dargomyzhsky, "the great teacher of musical truth," a champion of realistic art, a master of musical declamation, satire and the grotesque, an exposé of morals and a defender of the "humiliated and insulted." Opera moved towards social drama, folk tragedy, and epic. Glinka's harmonious, positive world excluded the castigation of the vices of society; the composer's unique style, combining the features of romanticism with a deep realistic basis and Mozartian clarity of language and forms, remained singular and inimitable. The objective, balanced tone of Glinka's musical statement, then and after, did not coincide with the open emotionality of the art of his followers; The composer did not strive to penetrate into the recesses of the mysterious Russian soul, and the shadowy, ugly sides of life were not combined with the beautiful face of music. Glinka is a lonely genius. He was able to open the "corridor of great Russian music", and he stepped aside, letting others through... Perhaps that is why Glinka's legacy is almost unknown abroad; the fleeting gaze of a foreigner will see the Russian beginning in the operas of Musorgsky and Borodin's "Prince Igor" - here it is, the birth of a national school! - the "Russian spirit" will be felt in the novels of L. Tolstoy and F. Dostoevsky much more strongly than in the poetry of A. Pushkin - the creative couple Glinke.

It is no secret that over the years Glinka became increasingly disillusioned with the Russian listener, believing them to be unprepared for real great art. This attitude was especially aggravated by the cool reception of the opera "Ruslan and Lyudmila". But even before its premiere, in March 1841,

When leaving abroad, the composer wrote to his family: “Take me away from here, I’ve already suffered enough in this nasty country, I’ve had enough!”<sup>17</sup> The expected success among the more enlightened, as he thought, European public did not come during his lifetime.

To say that in today’s Russia Glinka’s music is somehow suppressed, that he is overshadowed by his great followers, is false and deliberate. That the composer’s operas, given the current technical capabilities of the stage, could become enchantingly beautiful, and the type of costume and set performance, the only one corresponding to the author’s plans, would not be replaced by an economical version of the production, and even with cuts of the musical text adopted in the Soviet era - it is certainly true. Glinka is waiting for his director, set designer, costume designer, who subtly sense the nature of his style and consonance with the current era, especially in the Fatherland.

In the global musical space, as before, Glinka is waiting in the wings.

### Notes

1. *Merimee A. A Year in Russia // Revue de Paris, 1844, March.*
2. *Ibid.*
3. *Berlioz G. Michel Glinka // Journal des Debats, Paris, 1845, April-May. “An extremely nice article” was written by the editor of Revue Britannique, and Maurice Bourges also responded.*
4. *Kozlovsky O.A. (1757 - 1831), nobleman, Russian army officer, courtier; for several years he served in the Directorate of Imperial Theaters.*
5. *Teplov G.N (1717 1779), statesman at the court of Catherine the Second, honorary member of the Russian Academy of Sciences, senator; educated music lover.*
6. *Cit. by: Glinka M. Notes. M., Music, 1988. P.94-95.*
7. *Tchaikovsky P. Memoirs and letters. P., 1924. P.132.*
8. *Serov A. Memories of Mikhail Ivanovich Glinka. L., Music, 1984. P.5.*
9. *It is appropriate to remember that one of the first Russian musical writers, Alexander Ulybyshev, worked during these years on a three-volume monograph about Mozart, his eternal idol.*
10. *Glinka M. Notes. M., Music, 1988. P.57.*
11. *Ibid.*
12. *Ibid. “Sentimento brillante” - “brilliant expression of feeling” (Italian).*
13. *Ibid. P.60.*
14. *Ibid.*
15. *Glinka M. Notes, M., Music, 1988. P.57.*
16. *Ibid. P.73.*
17. *Quoted from: Levashova O. Mikhail Ivanovich Glinka. Book 2. M., Music, 1988. P. 18.*

中国巴扬手风琴的演奏特点  
**THE PERFORMANCE CHARACTERISTICS OF THE BAYAN-  
ACCORDION IN CHINA**

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**摘要:** 中国的手风琴表演——被列入科学研究领域一种新现象。这种乐器演奏方法具有古典表演风格的所有特征,具有完整的体系,包括基础科学方法,系统教育,表演和作曲创作。本文探讨了中国巴扬手风琴流派的形成过程。1950年该乐器走进专业领域,从那时起迅速发展。在不同的音乐机构开设手风琴班,组织比赛和举办音乐节,出版教科书和教学参考资料。与各国主要演奏家的文化经验交流,在巴扬手风琴表演的形成过程中起到了重要作用。演变的结果是成为世界级的表演风格,具有强大的独特性。在追溯了它的历史之后,文章作者阐述了它与其他国家演奏形式的不同特点。

**关键词:**中国乐器流派,巴扬,手风琴,笙,音乐史。

**Abstract.** *The article introduces a new phenomenon into the sphere of scientific research - accordion and accordion performance in the People's Republic of China. This instrumental school has all the features of a classical performing school and is an integral system, including a scientific and methodological base, an educational system, performance and composing. This article examines the process of formation of the Chinese accordion school. In the 1950s, the instrument entered the professional environment and since then has been developing at a rapid pace. Accordion classes are opened in various musical institutions, competitions and festivals are organized, textbooks and teaching aids are published. An important role in the development of button accordion performance is played by the exchange of cultural experience with leading musicians from different countries. The result of the evolution is a world-class performing school with great originality. Having traced its history, the author of the article formulates the features that distinguish it from models in other countries.*

**Keywords:** *Chinese instrumental school, button accordion, accordion, sheng, history of music.*



The Chinese accordion school is one of the most successful today. A large number of prestigious competitions and festivals, as well as professional performers and teachers, indicate that it has reached the international level. Her story is unique. In a relatively short period of time - just over a hundred years - it has gone through a surprisingly intensive path of development from acquaintance with the instrument to the creation of a unified creative platform, including a solid scientific and methodological base, a developed educational system, performance and composing. The phenomenon of the Chinese accordion school can become a good example for other countries. That is why the study of issues of its history and development features seems very relevant today.

The purpose of the article is to trace the path of formation of Chinese button accordion performance and, in the course of a historical excursion, to identify specific features that distinguish it from models in other countries. Until now, this issue has not become the topic of a separate study in Russian. At the same time, the rapid growth of the Chinese accordion school is of interest in musical science. Since the beginning of the 2000s. A number of works appeared that touched upon certain aspects related to the history and practice of performance, pedagogy and composition. In Chinese musicology, more attention is paid to these issues. There are articles and dissertations that examine the peculiarities of the formation of accordion performance, but they were created in the 90s. and there is a lack of a modern, fresh look at the problem. The purpose of this article is to partially fill the gaps in musicology, as far as possible within a small volume.

The prehistory of the Chinese accordion school began long before the appearance of push-button harmonicas in the country. It is associated with the ancient traditional musical culture of reed instruments, varieties of which - sheng, lusheng, yu - appeared in China more than 3000 years ago. It is important to note that the reed mechanism itself was first invented in China, and then influenced the creation of many European instruments of this kind, including the accordion. Among the sources<sup>1</sup> sheng is indicated as a direct predecessor of the button accordion and accordion. The traditional culture of reed instruments not only contributed to the creation of modern harmonics, but also became a kind of soil on which the accordion and button accordion art of the PRC is successfully developing today.

The history of the accordion in China is relatively young. The first push-button harmonics<sup>2</sup> appeared in the country at the turn of the 19th - 20th centuries. The small dimensions of the instrument, its low price and a fairly simple method of mastering<sup>1</sup> contributed to its rapid spread. The accordion quickly took root among amateurs and was used primarily for entertainment and pleasure [1, p. 17].

In the 1930-1940s, accordion performance developed under the influence of Russian emigrants. During this period, the first concert of a Russian orchestra, which included accordions, took place in Shanghai. The performance program

<sup>1</sup> Scheme of the occurrence and classification of harmonics by A. Mirek; History of button accordion and accordion art by M. I. Imkhanitsky.

consisted of transcriptions of Russian folk songs and Chinese traditional music. It is thanks to performers from Russia that the instrument enters the professional musical environment of China. Thus, in 1925, the Higher School of Music named after A.K. Glazunov was opened in Harbin, and in 1927, music courses were opened, which included the specialization “accordion”. However, at this time the instrument mostly functions in the circles of amateur musicians. It is used primarily as part of various ensembles to perform accompaniment. Solo performances by accordionists are relatively rare<sup>2</sup> [2, p. 62].

At the same time, in parallel with the development of accordion performance, the Chinese Society of Harmonica Lovers (under the leadership of Wang Qingxun) and the People’s Organization of Harmonica Lovers (founder - Shi Renwang) were created. Accordionists often took part in the concert programs of these societies.

The accordion experienced a qualitatively new stage of development in the 1950-1960s. The ratio of amateur and professional music-making is changing. In 1958, the leading conservatories<sup>3</sup> and many humanities universities in China are introducing the specialty “accordion” as a discipline.

With the creation of the People’s Republic of China, new trends appear in amateur music-making. The need to strengthen the military power of the young state and the propaganda of patriotic ideas had a significant impact on accordion performance. Military organizations create musical groups consisting primarily of accordionists<sup>4</sup> [1, p. 23].

Since the early 1950s, the production of harmonics began to develop in China. The first factories were created in Tianjin and Shanghai. Increasing the quality of instruments and improving their performance capabilities has led to a significant increase in the role of solo performance.

For a long time, the repertoire was dominated by transcriptions of folk songs, songs on military-patriotic themes, and foreign works. Only in 1962 did the first original work by a Chinese author appear - Li Yuqiu’s play “Cavalry in the Steppe” for a duet of accordionists. The first solo work was created in 1964 - “Arat Song” by Wang Yuping and Zhang Zengliang [3, p. 32].

During the Cultural Revolution<sup>5</sup> (1966 – 1976) accordion art develops under the great influence of the ideology of socialism. During the repressions and perse-

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<sup>2</sup> The first Chinese «accordions» were quite different from European ones. They were hand-type push-button harmonicas, the principle of which was to supply air to the metal voices by stretching and squeezing the bellows with your hands.

<sup>3</sup> The first Chinese push-button harmonicas did not have registers, which greatly simplified the development of the instrument.

<sup>4</sup> In the first half of the 1940s, a concert was held by accordionist Wang Dianzhi with the Hashen Orchestra, who performed an arrangement for accordion of “The Cuckoo Waltz” by the Norwegian composer Emanuel Johansson.

<sup>5</sup> The most important among them are the Shenyang Conservatory, organized on the basis of the Northeast Region Music School (the accordion class was headed by Zhang Zimin) and the Tianjin Conservatory, founded in 1958, where accordion classes were taught by Guo Tingshi and Wang Yuping.

cution of the intelligentsia, a time when many Western musical instruments were banned, the button accordion, on the contrary, found itself in the most advantageous position. It was very convenient to use for the purpose of promoting revolutionary ideas, since it is mobile and can be clearly heard in open areas (fields and work areas in factories) [1, p. 33].

During this period, performances by accordion ensembles, as well as solo or choral singing to the accompaniment of an accordion, became especially popular. The repertoire for the most part consisted of adaptations or arrangements of revolutionary songs<sup>6</sup> and numbers<sup>7</sup> from yangban performances (a special genre of performing arts on political themes, which became widespread during the Cultural Revolution) [4, p. 29].

The accordion was used primarily as an accompanying instrument. This aspect of performance reached new heights during the Cultural Revolution: the technique of accompaniment and harmonization of songs was improved. However, despite some positive aspects, the accordion art of this time was still in crisis.

The next twenty years (1977 – 1999) were more favorable. The political situation in the country stabilized, the economy recovered, which in turn opened the way for the development of Chinese culture. Accordion art during this period moves to a qualitatively new level. Flourishing is observed in all its areas: in performance, pedagogy, scientific and methodological activities. Modern composers pay more attention to the instrument; new works for the accordion are created in a variety of genres.

The sphere of existence of the instrument is changing. If during the Cultural Revolution it functioned primarily in mass and everyday music-making, then in 1977-1999. it is most actively developing in the field of professional music. The quality of education in this area has increased significantly compared to the previous period. The number of professional accordion teachers in conservatories has increased 8 times (from 10 to 80 specialists). A major role in the development of accordion art in China belongs to such outstanding figures as Chen Yiming, Zhang Zimin, Li Min, Wang Yuping, Wang Shusheng, Chang Zhiguo and many others. They have trained excellent performers, including Cao Xiaoqing, Zhu Kai, Luo Han and others. In addition, they were actively involved in educational activities [1, p. 38].

In the 80s a scientific and methodological base is being formed. Articles and books appear devoted to the theoretical understanding of performing and teaching the accordion. In 1984, China's first accordion community, the National High Level Accordion Society, was established. The editors of this association published the first professional scientific publication "Accordion Club". In the same

<sup>6</sup> Ensembles of the Maritime State Administration (founded in 1951), the Main State Administration (1953), the State Aviation Administration (1958)

<sup>7</sup> The Great Proletarian Cultural Revolution was a series of ideological and political campaigns in China led by Mao Zedong.

year, the Council for the Performing Arts of the People's Republic of China published the newspaper "Chinese Accordion", creating conditions for improving the theory of the accordion and the exchange of information [5, p. 18].

The quality of amateur music-making has also changed. In the 80s accordion schools and training classes for amateur accordionists opened in many cities across the country. The earliest amateur accordion school was established in Beijing in March 1985. At the same time, a special "accordion for junior high" curriculum was prepared. Since 1989, amateur accordion exams have been introduced at the Sichuan Conservatory. Later, the Chinese Accordion Association established the National Commission for Amateur Instrumental Playing. This organization helped popularize the instrument and developed many educational materials. Interest and general attention to the accordion is maintained at the state level [6, p. 15].

The policy of reform and openness contributed to the expansion of creative contacts with foreign performers and teachers. Since the 80s World famous accordionists regularly come to China. In October 1984, Professor Robert Davin from the Department of Music at the University of Denver (USA) first introduced most Chinese musicians to accordion music from developed countries in Europe and America. In March 1985, the Tianjin Conservatory invited the German accordionist of Japanese origin and teacher of the accordion department of the German National Music University Ruhr Miko Miko. Cultural exchange with foreign musicians significantly expanded the view of the concept of Chinese accordion performance [6, p. 14].

At the same time, many Chinese accordionists are educated abroad (in Russia, Germany, France and other countries). The number of domestic teachers and performers who have been able to generalize the international experience of playing and teaching the accordion is gradually growing. An important indicator of improving the quality of performance is numerous victories at international competitions. In 1987, Chinese Academy of Broadcasting musician Zhang Guoping took sixth place at an international competition in Klingenthal (Germany). In August 1988, a young teacher at the Sichuan Conservatory, Chen Jun, received the "outstanding acting" award at an international competition in New York (USA). In addition, some high-ranking accordion experts of the older generation were invited to serve as juries for international competitions, and Professor of the Sichuan Conservatory Wu Shouzhi became an international judge of international accordion competitions in Auckland, New Zealand, St. Petersburg, France, Paris [5, p. 20].

Since the 90s. Competitions and festivals of international level are organized in China. One of the brightest and most significant is the International Accordion Festival in Beijing (held from 1993 to the present). Much attention is paid to the creation of youth competitions<sup>8</sup> [1, p. 40-42]. The listed and other events, the

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<sup>8</sup> The most famous songs are "The Sun Never Sets on the Steppe" by Meili Qige and "Defense of the Native Frontiers" by Zeng Jian.

exchange of experience with foreign colleagues, the unprecedented growth in the quality of professional and amateur performance indicate that in the last third of the 20th century, Chinese accordion art reached new heights in its development.

The role of the instrument in China in the 21st century is very ambiguous. On the one hand, the victories of accordionists at international competitions, the emergence of new works for the accordion, and the development of the music education system allow us to talk about improving the quality of professional performance and pedagogy. On the other hand, among amateurs there is a significant decrease in interest in the accordion.

Thus, a brief overview of the history of Chinese accordion performance clearly demonstrates the uniqueness of this instrumental school. Let's list its features:

1. Rapid and spasmodic development in a very short time.
2. Connection with the ancient tradition of Chinese reed instruments.
3. The Chinese accordion school was formed under the influence of Western European thinking and bears all the signs of a professional performing school of the classical type.
4. Widespread amateur music-making in various forms.

Chinese accordion art is a unique phenomenon that has a number of features that distinguish it from instrumental schools in other countries. Today it occupies one of the leading positions in the world musical art, as evidenced by the number of prestigious competitions and festivals, as well as professional performers and accordion teachers. The phenomenon of the Chinese accordion school requires further research.

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国际互动特征——以中国跨境地区为例

**FEATURES OF INTERNATIONAL INTERACTION ON THE  
EXAMPLE OF TRANSBOUNDARY AREAS OF CHINA**

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抽象的。在当前的经济形势下，亚洲地区国家众多、充满活力、文化多元、自然资源基础丰富，国际合作尤为重要。各国通过在跨境地区设立经济合作区来实现提高竞争力的共同努力。

关键词：跨境地区、经济、边境省份、交通物流走廊、经济项目。

**Abstract.** *In the current economic situation for the countries of the Asian region, in which there is a significant number of dynamically developing countries with a mosaic culture, as well as a rich natural-resource base, international cooperation is of particular relevance. Joint efforts of the countries to improve competitiveness are realised through the formation of economic cooperation zones in cross-border regions.*

**Keywords:** *cross-border region, economy, border provinces, transport-logistic corridors, economic projects.*

For countries with large territories, the problem of equalising the internal level of socio-economic development of regions is always relevant, especially if they are complicated by natural features such as: mountains, deserts, wetlands and so on. A special direction of foreign economic activity in this case will be the development of border territories. Successful implementation of foreign economic cooperation is largely conditioned by neighbouring countries. The mosaic nature of the Asian region and different levels of economic development determines the relevance of the development of border regions. This is especially important for the PRC with its vast territory and a significant number of neighbouring countries, whose economies, in most cases, are below the level of economic development of the state.

Cross-border regions occupy about 70% of China's territory, have rich natural resource potential and favourable geopolitical position, which may provide them with the highest economic growth and level of development in the future. China's cross-border regions are unique areas at the crossroads of cultures, economies and geopolitical interests of several countries. However, most of the country's northern, western and southwestern regions lag significantly behind the country's overall economic development level. The reasons for this are many factors: under-developed transport infrastructure, outflow and ageing of the population, lack of highly skilled labour, the predominant number of extractive industry enterprises, low investment attractiveness, agrarian type of economy, as well as close territorial proximity to countries with a lower level of socio-economic development compared to the PRC. All these factors have a negative impact on the development prospects of these provinces. In order to change the current situation and expand the geography of foreign economic activity, China and its neighbouring countries are taking a number of measures to develop peripheral regions, including investment in transport, trade, international tourism and the creation of new cross-border areas.

One of China's most significant initiatives to develop the western regions of the country, is the "Great West Development Strategy". The authorities of the People's Republic of China transformed and re-launched this programme in May 2020. However, the official start of the strategy was announced back in 2000. The programme is aimed at developing 6 provinces of the People's Republic of China - Gansu, Guizhou, Qinghai, Shaanxi, Sichuan, Yunnan, 5 autonomous regions - Guangxi Zhuang, Inner Mongolia, Ningxia Hui, Tibet, Xinjiang Uygur and one central city – Chongqing [12].

According to Wharton Research Data Services, in the "11th Five-Year Development Plan of the People's Republic of China", a large number of infrastructure projects have been planned and built in Western China, such as roads, railways, airports and inland navigation. In addition, energy bases, chemical industry, machinery, and natural resource extraction and processing enterprises have been built. In the period since the 2000s, it can indeed be seen that the growth rate of most western provinces has surpassed the Chinese average over the same period. However, the overall development is still low compared to the mainland. Since the early 2000s, the annual contribution of the western provinces to China's GDP has been only about 17 per cent, and the share of foreign direct investment over the same period has risen to only 6 per cent of the total foreign direct investment in the whole country according to WRDS [8].

The "12th Five-Year Development Plan of the People's Republic of China" put forward proposals to expand airports and shipping channels. In addition, China has begun building international railways such as China-Kyrgyzstan-Uzbekistan and

Kunming-Singapore, as well as expanding the road networks of the western region to Southeast Asia, and South Asia to create an international logistics corridor [8].

In the “13th Five-Year Development Plan of the PRC”, WRDS identified 3 main aspects of the development of the western provinces.

1) Creation of new international corridors: along China, Mongolia and Russia, between Europe and Asia, between China, Central Asia and West Asia, between China and the Indochina Peninsula, between China and Pakistan, between Bangladesh and China, between China-India and Myanmar, and the extension of the Beijing-Tianjin-Hebei transport route to the western regions of the country.

2) Developing a new spatial scheme called “Five Horizons, Two Verticals and One Ring” for the development of the western regions. “Five Horizons” covers the western part of China, including the Beijing-Tibet corridor, the Yangtze-Sichuan-Tibet water transport corridor, the Shanghai-Kunming corridor, and the Pearl River-Xijiang corridor. “Two Verticals” refers to the Baotou-Kunming Corridor and the Huh-Hoto-Nanning Corridor, and the One Ring covers the borders of Western China. The PRC government is interested in increasing the density of road, rail and air networks, as well as increasing transport infrastructure facilities such as airports and ports.

3) Developing industrial innovation in the western subjects of the country [8].

Currently, there are 11 major economic zones in China’s cross-border regions, but the list varies. Cross-border regions are characterised by specific features in the implementation of economic programmes of cross-border cooperation. The concept of cross-border regions in China is a key element of the country’s economic development strategy. Such zones are created to stimulate economic growth by attracting investment, developing industries, improving infrastructure and creating favourable conditions for business development.

**Table**  
*local GDP of China’s border regions in the year 2023.*

Province	Main Specialization	GDP 2023 (RMB billion)	Share of Total China’s GDP (%)
Xinjiang	Energy and raw material base, transport infrastructure	1912	1.52%
Tibet	Tourism	239	0.19%
Jilin	Agriculture, industry	1353	1.07%
Yunnan	Tourism, agriculture	3002	2.38%
Heilongjiang	Industry, agriculture	1588	1.26%
Liaoning	Heavy industry, international trade	3020	2.40%
Inner Mongolia	Energy, agriculture	2462	1.95%
Guangxi	Tourism, agriculture	2720	2.16%



Completed on basis of [ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]

The following administrative entities of China have achieved the greatest success in implementing cross-border cooperation programmes: Yunnan, Guangxi and Liaoning. According to the results of 2023, the local GDP of these provinces was the highest among the border regions. The development of cross-border areas is to a greater extent ensured by the participation of the PRC, in contrast to which the neighbouring countries often neglect to fulfil their contractual obligations, which is reflected in the slow pace of their economic development [8].

Yunnan, a key border province of China, borders Southeast Asia and has a geostrategic advantage, rich mineral and biological resources, as well as a unique ethnic culture and tourism potential. Despite slow industrial development and low rates of urbanisation, primary industry plays an important role in the economy, especially in agriculture with the cultivation of walnuts, coffee, tea and fruit. Yunnan's GDP per capita in 2022 was 61716 yuan, well below the national level. The net inflow of permanent population from 2010 to 2020 was minus 1.646 million, indicating migration from the province. The manufacturing industry in Yunnan has shown above-average growth, especially in the manufacturing industry, where the value added for 2014-2022 was 7.33%, exceeding the national level. The green energy and non-ferrous metal recycling industries, particularly the aluminium industry, are growing strongly. Tertiary industry, although less developed, has grown from 39.47% to 49.98% of the region's total local GDP from 2014 to 2022. Tourism has become a key sector, with the added value of cultural tourism growing 27.7% from 2015 to 2019. Investment in Yunnan is growing faster than the national average, with an average annual growth rate of 14.97%. Fixed investment averaged 85% of local GDP, far exceeding the national level [7].

Liaoning, a key industrial province in northeastern China, borders Russia and North Korea. The region has significant reserves of natural resources, including coal, iron ore and oil, and is known for its pilot free trade zone established to stimulate economic development. Liaoning is famous for its heavy industry, accounting for 86.5% of the province's industrial output, with strong positions in machinery, petrochemicals and food processing. In terms of secondary industry, tourism is its key element. Foreign trade is conducted mainly through the port of Dalian, with an emphasis on agricultural exports and imports of steel and electronic parts. Foreign investment is concentrated in Dalian and Shenyang, especially in manufacturing and property, with Hong Kong as a major source of investment [11].

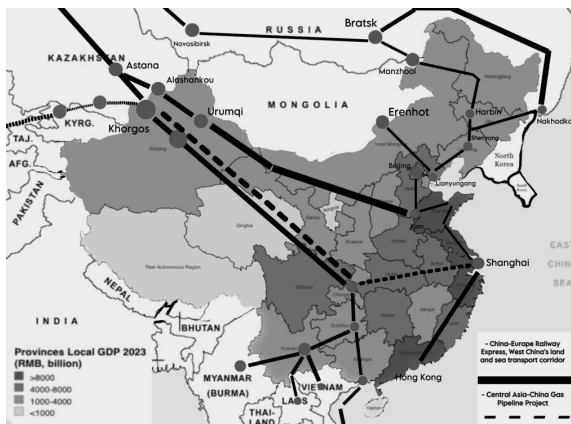
Guangxi Zhuang Autonomous Region is located in southern China. With a land border, Guangxi has direct access to Beibu Bay. Known as the "bank of natural medicine", Guangxi specialises in, medical care and tourism, also characterised by slow industrial development and low urbanisation. The extractive industry in Guangxi has a high share of local GDP, surpassing national figures with an average annual growth rate of 8.3%. Agriculture, livestock and fisheries have

shown steady growth, with notable success in exotic fruit and pork production. The service sector is developing more slowly, with a share of about 50% of local GDP, slightly lower than the whole country. Investment in Guangxi is on the rise, exceeding national levels with a total of RMB 2.79 trillion in 2022 and an average annual growth rate of 12.14%. Despite its low GDP per capita and the challenges of population migration, Guangxi continues to strengthen its economy through the development of primary industry, tourism and other sectors [2, 5].

One of the most significant initiatives of the Chinese government to develop not only the western provinces, but also the whole country, as well as the development of international cooperation is the One Belt, One Road programme. Within this initiative, starting from 2019, other significant projects have been announced, linking not only western and eastern regions, but also foreign countries.

The land and sea corridor of the Western region of China is a part of the “New Silk Road”. This project is aimed at creating an integrated transport network that connects China’s western provinces with ports in Southeast Asia, South Asia and further to the Middle East and Europe via land and sea routes. The key objective of the Western Region Land and Sea Corridor is to accelerate the economic development of China’s inland and western regions, providing access to international markets and reducing logistics costs. The project includes the construction and modernisation of railway lines, roads, ports and logistics centres, as well as the development of infrastructure to simplify customs and border procedures. One of the key aspects of this programme is the strengthening of transport infrastructure at the key transit point Khorgos on the border with Kazakhstan, as well as the development of a transport and logistics system between China-Singapore-Southeast Asia [8].

Map - main transport and logistics routes for cross-border cooperation of the People’s Republic of China



Compiled on the basis of [8,3].

Another key point for the development of cross-border regions is the Central Asia-China gas pipeline project, a large-scale infrastructure initiative aimed at transporting natural gas from Central Asian regions to China. The project is a key part of China's strategy to diversify its energy sources and increase natural gas supplies to meet growing domestic demand. The Central Asia-China gas pipeline is also important for the Central Asian countries as it gives them access to a large and growing market, promotes economic development and increases revenues from energy exports. The gas pipeline from Turkmenistan passes through Uzbekistan and Kazakhstan to China (Xinjiang) and includes several lines. According to Global Energy Monitor, the first three lines of the pipeline have a total design capacity of more than 55 billion cubic metres of gas per year [8].

The China-Europe railway express is an equally important part of the project. This project aims to strengthen economic, trade and infrastructure ties between China and the European Union through the establishment of accelerated railway routes. The China-Europe Railway Express is a key element in the development of intercontinental trade, offering a faster, cleaner and more efficient alternative to sea and air freight transport. The railway routes of this corridor cover dozens of countries, passing through Russia, Kazakhstan, Belarus, Poland and other Central and Eastern European countries, connecting major Chinese cities with European trade centres. In addition, the Trains can cover the distance between China and Europe in 14-18 days, which is much faster than sea transport, which takes 30-45 days, and rail transport carries a wider range of goods compared to other modes of transport [8].

In addition, virtually all of the PRC's major transport routes are currently maritime and pass through the Strait of Malacca. However, the Malacca Corridor is the subject of international discussions, referred to as the "Malacca Dilemma", which, in the event of unforeseen circumstances such as a maritime blockade of the Strait, could have serious consequences for the PRC's food and energy security, which is why China is seeking to diversify international transport routes, including through the development of cross-border regions. The development of cross-border regions helps to improve the socio-economic situation, investment climate and reduce China's overdependence on maritime trade.

结论： 跨境合作计划的实施是促进中国与邻国边境地区社会经济有效发展的工具。 然而，项目的成功实施取决于双方的努力，因此一些中国边境地区尚未达到计划的水平，仅部分实现了既定目标。

**Conclusion:** The implementation of the cross-border cooperation programme is an effective tool for boosting the socio-economic development of the border regions of both China and its neighbours. However, the success of the projects being implemented depends on the efforts of both sides, so a number of PRC cross-border regions have not yet been able to reach the planned level, only partially realising the set goals.

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筑巢季节结束时贝加尔湖水域的鸟类数量

## BIRD POPULATION IN THE WATER AREA OF LAKE BAIKAL AT THE END OF THE NESTING SEASON

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抽象的。基于繁殖季结束时(2023年7月25日至8月8日)的实地调查,提供了贝加尔湖水域鸟类数量和分布的新资料。此时,鸟类的春夏迁徙已经结束,但大规模的秋季迁徙尚未开始。这使得估计迁徙期之外鸟类的多样性和丰度成为可能。这些信息对于了解湖泊本身(100 m 以内的海岸带和湖泊水域)鸟类种群的形成特征非常重要,因为它们与在邻近地区获得的材料有很大不同。在邻近地区获得的信息并不表征湖泊本身,而是表征其盆地,在分析收集到的信息时实际上没有考虑到这一点。同时,该湖本身的鸟类种群尚未得到充分研究,其总体特征仍不得而知。必须考虑到,我们在这里讨论的是滨鸟和水禽,因为在筑巢期间在海岸上发现的其他生态类群的物种很少且数量很少。这些相遇大多是偶然的。由于该湖浅水区面积较小(与其大小相比) - 这是贝加尔湖裂谷带中部形成的水下峡谷,鸟类的物种组成及其数量 这次的名额非常有限。只有少数物种达到高丰度,它们要么是高度专业化的食鱼潜水者,要么相反,具有非常广泛的生态位。在这里观察到的所有其他生态鸟类的数量极其有限。

关键词: 贝加尔湖、鸟类、繁殖后季节、物种组成、分布和丰度。

**Abstract.** *Based on field research at the end of the breeding season (from July 25 to August 8, 2023), new materials are provided on the number and distribution of birds in the waters of Lake Baikal. By this time, the spring-summer movements of birds had ended, but the mass autumn migration had not yet begun. This makes it possible to estimate the diversity and abundance of birds outside the migration period. This information is important for understanding the characteristics of the formation of the bird population of the lake itself (the coastal zone within 100 m and the lake's water area), since they are very different from the materials*

*obtained in the adjacent territories. The information obtained in the adjacent territories does not characterize the lake itself, but its basin, which is practically not taken into account when analyzing the collected information. At the same time, the bird population of the lake itself has not been fully studied, and its general characteristics are still unknown. It must be taken into account that we are talking here about shorebirds and waterfowl, since species of other ecological groups are found on the coast during the nesting period quite rarely and in small numbers. Most of these encounters are accidental. Due to the fact that the area of the shallow waters of the lake is small (compared to its size) - this is an underwater canyon formed in the central part of the Baikal rift zone, the species composition of birds and their numbers at this time are very limited. Only a few species reach high abundance, which are either highly specialized ichthyophagous divers or, conversely, have a very wide ecological niche. All other ecological groups of birds are observed here in extremely limited numbers.*

**Keywords:** Lake Baikal, birds, post-breeding season, species composition, distribution and abundance.

**Introduction.** Despite long-term studies of Lake Baikal [6-18], new species are still found in its bird fauna. This is due, first of all, to modern trends towards an increase in the species richness and diversity of birds as a result of strong and rapid climate warming in the more southern regions of Inner and Central Asia. As a result of these processes, many species of birds move en masse to the northern borders of their ranges. In addition, many authors use the estuaries and deltas of large rivers flowing into Baikal as the basis for their research. They are characterized by an increased diversity of bird habitats, and, consequently, their rich fauna. Despite long-term studies of Lake Baikal [6-12, 15], new species are still found in its bird fauna. This is due, first of all, to modern trends towards an increase in the species richness and diversity of birds as a result of strong and rapid climate warming in the more southern regions of Inner and Central Asia. As a result of these processes, many species of birds move en masse to the northern borders of their ranges. In addition, many authors use the estuaries and deltas of large rivers flowing into Baikal as the basis for their research. They are characterized by an increased diversity of bird habitats, and, consequently, their rich fauna.

**Material and methodology.** As a result of field work from July 25 to August 8, 2023, a survey of the coasts of the entire Lake Baikal was carried out using the Research vessel “Professor A.A. Treskov.” Physiographical features of the lake Baikal and, above all, climatic conditions, make it possible to divide its basin (water area and adjacent territories) into three climatic districts: South Baikal, Middle Baikal and North Baikal. They differ in the severity of climatic conditions - it increases noticeably from south to north (the climate continentality coefficient

according to Zenker increases from 62 to 64) [1]. At the same time, the division of the lake Baikal into three sections (Southern, Middle and Northern), does not coincide with the boundaries of climatic districts. Therefore, our similar names for different parts of the lake Baikal do not reflect its previous division and provide ornithological characteristics of the corresponding climatic districts.

The coastline with exits to the shore during overnight stays and layovers of the vessel in strong storm winds was completely examined from the boat. At this time, small species of birds were taken into account (passerines, Charadriiformes, Coraciiformes, Hoopiformes and other groups), which were impossible to count and identify from a boat even with the use of special optical equipment. However, the majority of these species do not belong to coastal birds or they are found here only during periods of migration. Coastal bird counts were carried out using 12x binoculars throughout the entire period of the vessel's passage along the coast. The work methodology is covered in detail in a special publication [11].

Coastal birds found on Lake Baikal, during periods of searching for food, develop areas of its water area with depths of up to 10 m. However, the great cormorant, judging by the literature, is capable of exploring depths of up to 30.0 meters or more [20]. At the same time, the drop in depths on the shores of Lake Baikal is very sharp and the shallow water zone is very small. It is only about 7.0% of the entire area of this huge lake, which forces the birds to constantly stay at the edge of the shore [15]. Away from the coast, they are found only during flights and rest. During periods of migration, when birds cross Lake Baikal, they can be found in any part of it, often in very large flocks, but the number of such meetings is limited [6-9, 13-14].

The total length of survey routes in this season was 2,200 km, and individual sections of the coast were surveyed two or even three times. In addition, Baikal was crossed several times when crossing from one shore to another. We examined the entire coastal zone of Lake Baikal in one season. During periods of strong storms, the ship settled in places with no strong waves. As a result of the work, a general ornithological characteristic of the water area lake Baikal was obtained after the 2023 breeding season. During our work, we recorded encounters of all species of birds, many of which are of undoubted interest for ornithologists and the general ornithological and faunal characteristics. The species structure of birds and the order of their description are given according to the latest ornithological reports of Russia, Siberia and adjacent territories [2-3, 5, 16, 18-19].

**Results.** Detailed survey of the coastal lake. Lake Baikal throughout its entire water area made it possible to determine the species composition of birds and their numbers after the breeding season before the start of mass autumn migration. This allows us to get a complete picture of the species composition of birds during this period. However, their total number is associated with the breeding conditions



of birds of a given year and is completely determined by the characteristics of a particular nesting season: weather conditions, availability of food, the strength and frequency of storms, fluctuations in water level, as well as anthropogenic load on the shores of the lake [6-8, 12-14].

**Great Cormorant *Phalacrocorax carbo*.** Common in colonies, but the majority of chicks had already fledged by the time of work. Distributed everywhere, but more often found in areas of colonies in the central part of the lake Baikal. Small groups are relatively rare. The largest accumulations were found in Chivyrkuisky Bay. Large feeding aggregations were noted when entering the Posolsky Sor and Proval bays [6-9, 13-15]. The total number in this operating season is at least 55,400 birds.

**Gray Heron *Ardea cinerea*.** At this time, a very rare species in the Baikal waters [6-8, 14]. The number of birds encountered does not correspond to their abundance in the Selenga delta. They clearly stay in its internal areas. The majority of encounters of this species were recorded on the islands of the Maloye More Strait and in the Goloustnoy river delta (Middle Baikal). Here, in its upper part, there is a small colony of this species. The total number of birds encountered was 27 individuals.

**Ruddy Shelduck *Tadorna ferruginea*** is a common, but not numerous species of the lake shores Baikal. Usually there are single, most likely immature males and pairs with broods. More common on the southwestern coast of the lake. Baikal [6-8, 13]. The total number during this period is no more than 30 birds. Probably, the main part of birds of this species already leaves their nesting sites at this time. The passage of the Scorch virtually ends by mid-August.

**Goldeneye *Bucephala clangula*.** In summer, there are few species of waterfowl in Southern Baikal [6-8, 13]. During the survey period in 2023, 420 birds were encountered and, obviously, these are males migrating to molt.

**Melanitta Deglandi *Melanitta deglandi*.** Very rarely observed during this period in the coastal zone of the lake. Baikal [6-8, 13]. During the work period, only one group of this species of 4 birds was encountered.

**Red-breasted Merganser *Mergus serrator*** - found everywhere in small bays and bays. Some broods have not yet fledged, but there are relatively few of them. On the southeastern coast of Lake Baikal (from the town of Slyudyanka to Proval Bay) a large molting aggregation of drakes of this species was discovered. At the same time, flight broods that have not formed flight flocks are found everywhere in small numbers. In northern Baikal, its abundance decreases sharply [6-8, 12-13]. The total number reaches 1212 birds.

**Goosander *Mergus merganser*.** Not numerous, but quite a common species during the migration period. During the nesting period it occurs in small flocks and single broods [6-8, 12-13]. The total number of the species on Lake Baikal at this time is insignificant - 28 birds.

**Black Kite *Milvus migrans*.** A very rare species, found near shepherds' camps and populated areas [6, 12-13]. During the period of work in different regions of the lake Baikal met 2 birds.

**White-tailed Eagle *Haliaeetus albicilla*.** A very rare species of Lake Baikal, included in the Red Books of Russia, as well as the Irkutsk region, the Republic of Buryatia and the Transbaikalian Region [6-8, 12-13]. During the period of work this year, 18 individuals were noted in different areas of Lake Baikal. Nesting on the island has been accurately established Olkhon (nest with three chicks) and on the island Goliy Kylytsey in Chivyrkuisky Bay (nest with chicks, but their exact number could not be determined).

**Black-headed Gull *Larus ridibundus*.** Very rarely found in the waters of the lake Baikal during this period. Its main habitats are the delta of the Upper Angara and Kichera rivers, as well as the delta of the river. Selenga [6-8, 12, 14]. A total of 24 birds were recorded, mainly in the bay near the town of Tankhoi.

**Mongolian Gull *Larus (vegae) mongolicus*.** At the end of July - beginning of August, these are common birds of the Baikal coasts and a significant part of them at this time stay in the areas of the colonies (Maloye More Strait, Chivirky Bay, edges of the deltas of the Selenga, Upper Angara and Kichera rivers). This is due to the fact that in many pairs the chicks have not yet learned to fly by this time. Small accumulations are observed in the port of the village Listvyanka – up to 100-150 birds [6-8, 10, 12, 14, 17]. The total number we obtained as a result of our work is 8632 birds.

**Mew Gull *Larus canus*** is one of the common species along the shores of Lake Baikal. At this time, it does not form large aggregations and is found as single individuals, less often in pairs and small groups, resting on the sandy capes of the coast [6-8, 12, 14] - total 743 birds.

**Black-legged Kittiwake *Rissa tridactyla*** is an extremely rare bird species at this time and has not been recorded by anyone here before during this period. A single bird was observed in flight at a distance of about 30.0 m from the vessel in the Maloye More Strait.

**White-winged Tern *Chlidonias leucopterus*.** A very rare bird in the waters of Lake Baikal, although in the deltas of rivers flowing into this lake, it is a common and numerous species [6-8, 12, 14]. During the entire period of work, only one bird was recorded.

**Chegrava *Caspian Tern*.** Very rarely noted in records, although in the delta Selenga river there is a large colony of this species [6-8, 12, 14]. Over the entire period of work in this season, we noted 3 birds in the shallow waters of the Upper Angara.

**Common Tern *Sterna hirundo*.** Very rarely found on Lake Baikal, even at river mouths [6-8, 12, 14]. During the period of work, 10 birds were observed in different areas. It was more common at the mouth of the river Turka.

**Black Swift *Apus apus*.** Numerous species on the rocky islands of the Maloye More Strait and rocky areas of the shore of Olkhon Island. On the coast of Lake Baikal it is observed in areas of rocky outcrops, where it can also reach very high numbers - individual colonies are several hundred individuals in size. Common on the eastern coast of this lake along the East Siberian Railway. It is most often found in areas of river mouths flowing into Lake Baikal, and nests on adjacent rocks.

**Fork-tailed Swift *Apus pacificus*.** A rare species on the western coast of Lake Baikal (Olkhon Island). It is found everywhere in areas of settlements with high-rise buildings (four floors and above), but is not numerous everywhere.

**Barn Swallow *Hirundo rustica*.** A common species, but rarely seen in the lake area. During the period of work, it was encountered near populated areas while hunting for insects over the waters of Lake Baikal. Almost all the birds were recorded in the bay near the small town of Tankhoi. A total of 37 birds were recorded.

**Pale Sand Martin *Riparia diluta*.** Relatively recently, taxonomists isolated *Riparia riparia* from the composition of the shorebird. During the period of work, two birds were noted once in the area of a stationary bird's trap of the Rybacha type for catching birds in the Baikal Nature Reserve.

**The Eastern Carrion *Corvus (corone) orientalis*** is found everywhere, but is more common along the southeastern coast of Lake Baikal. Most often, single individuals and rarely pairs are observed. They are usually observed near the tent camps of tourists and, obviously, are attracted here by the remains of their vital activity [6-8, 12, 14]. This season we have registered about 50 birds of this species on the coast of the lake Baikal is very little.

**Raven *Corvus corax*.** A common but scarce species of Lake Baikal [6-8, 12-13]. During the period of work, it was encountered only once near the village of Khuzhir (Olkhon Island).

**Discussion.** It should be noted that the period of field work occurred at a time when the spring-summer movements of birds had completely ended, but their mass autumn migration was still absent. Only isolated individuals appeared with early-started autumn migration. Consequently, this is the time when the Baikal water area was characterized by its typical summer bird fauna. This makes it possible to correctly assess the living conditions of birds of the coastal complex and identify the most characteristic species among them [7].

Just as in previous census works, attention is drawn to the very low abundance of the main part of the recorded birds, although in the mouths and deltas of rivers the abundance of many of them was very high. However, already at the edge of the lake it sharply decreased, which indicates rather harsh conditions for their habitat in the open waters of Lake Baikal [8]. They were found only in certain areas of it,

exclusively in single specimens and small groups of 2-3, rarely more, birds. In many cases, such encounters were isolated in nature, which indicates their random appearance in such places [7].

The exceptions are large colonies of Great Cormorants *Phalacrocorax carbo* and Gull Birds, mainly the Mongolian gull *Larus (vegae) mongolicus*. They form nesting aggregations on islands in the Maloye More Strait, Chivyrkuisky Bay and in the delta Selenga river [6-8, 12, 14]. These areas of lake Baikal are developed almost exclusively by ichthyophagous birds, capable of actively foraging in the water column, as well as omnivorous species that collect food both on the surface of the water and on land [8]. The latter are primarily scavengers, which is confirmed by the sharp increase in their numbers in the post-war years, as the region was industrialized. These include all species of large gulls [7].

In addition, certain areas of Lake Baikal are characterized by high numbers of a very specialized group of aerial birds that forage in the air - swifts [9]. The Black Swift *Apus apus* reaches its greatest abundance on rocky islands and in the vicinity of rocky cliffs and outcrops. Waterfowl and Shorebirds birds are also found in such areas, but reach high numbers only for a very short period during mass migrations in the autumn [7].

The largest number was observed in the Great Cormorant - a typical ichthyophage, for which the conditions of the lake Baikal are quite optimal for nesting [7-10, 12, 14-15]. Another ichthyophagous species, the Red-breasted Merganser, is a common nesting species in the coastal zone of lake Baikal. However, he apparently uses small fish and catches gammarus in large numbers. In addition, this species forms a molting aggregation on the southeastern coast of the lake - from the town of Slyudyanka to Posolsiy Sor Bay. Two other common species of birds - the Mongolian and Mew Gulls - are omnivores with a very wide range of food used, both plant and animal origin. These species collect dead fish from the surface of the water, which is one of their main feeds, use fishing waste, catch aquatic insects and collect locusts in the meadows and steppes of the Baikal coast [6-8, 10, 12-13, 17]. In our conditions, they are classified as scavengers who widely use food of anthropogenic origin. Therefore, their abundance in the vicinity of large human settlements is usually high.

It is well known that colonial birds nest, first of all, in maximum proximity to the main food sources [7, 15, 17]. At the same time, the formation of Mongolian gull colonies along the less productive southwestern coast of the lake Baikal is determined on the one hand by the proximity of food of anthropogenic origin, on the other by the high inaccessibility of the habitats used for terrestrial predators and, above all, humans (hard-to-reach steep slopes, cliffs and rocks). A large number of tourists along the Circum-Baikal Railway, as well as in the vicinity of the village Listvyanka and the village of Bolshie Koty, forces birds to occupy such areas for nesting [7].

**Conclusion.** The obtained materials clearly show that lake Baikal, as a specific deep-sea mountain reservoir, without the various habitats surrounding it, is unsuitable for habitat for most bird species. Only four species reach sufficiently high abundance (Great Cormorant, Mongolian Gull, Red-breasted Merganser and Common Gull) and another species (Black Swift) has locally high abundance. The main reason for this is significant depths in the main area of the lake, inaccessible to most species. The productivity of Baikal is very high, which is emphasized by hydrobiological samples collected throughout its entire area [4]. However, these feeds are unavailable or very difficult to access for the majority of birds.

*The work was carried out within the framework of topic No. 121032900077-4 "Ecological diagnostics of changes in some elements of biogeocenoses in the territory of Eastern Siberia." The equipment of the Center for Collective Use "Scientific Expedition Center "Baikal"" (<https://ckprf.ru/catalogue/ckp/3213559/>) was used in this article.*

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DOI 10.34660/INF.2024.83.78.025

活动义齿对义齿床组织及口腔微生物菌群的影响分析

**ANALYSIS OF THE INFLUENCE OF REMOVABLE DENTURES ON  
THE TISSUES OF THE PROSTHETIC BED AND THE MICROBIAL  
FLORA OF THE ORAL CAVITY**

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Removable dentures made of polymers have an impact on restoring not only the shape, but also the function of the patient's masticatory apparatus if they have dentition defects. Also, removable structures help create articulatory balance and concentrate the body's reserve forces. Many scientific works have shown that removable dental structures are a foreign body in the patient's oral cavity, which has a negative effect on the soft and hard tissues of the oral cavity. This is a mechanical, chemical-toxicological, sensitizing and thermal insulating effect on the prosthetic bed and the oral cavity.

Data from a review of literature sources showed that gender and age characteristics play a key role in the degree of influence of the bases of removable acrylic dentures on the oral mucosa. It was observed that in females this symptom is observed to a greater extent than in males. The analysis of the literature data that we carried out allowed us to state that dental acrylic polymers, from which removable plate dentures are made, contain a number of components that have a sensitizing effect on the oral cavity. These activators, plasticizers, dyes and inhibitors can penetrate the patient's body through the oral mucosa and have a negative effect on it.

Clinical data indicate that inflammatory changes in the mucous membrane of the prosthetic bed are observed in more than 50% of patients using removable dentures made of acrylic polymers. Literature data indicate the presence of varying degrees of pathological reactions from the soft and hard tissues of the prosthetic bed, which manifest themselves in 70% of people with complete and partial absence of teeth, for whom removable acrylic dentures were made.

The scientists' data allowed us to conclude that under the plastic bases of removable denture structures, thinning of the mucous membrane may occur. These processes are observed not only with increasing age of patients, but also as a result of the influence of removable acrylic dentures on the soft and hard tissues of the prosthetic bed, affecting the decrease in the trophic function of the epithelium of the oral mucosa. It was noted that the use of removable acrylic dentures for three years affects the process of thickening of the periosteum of the alveolar ridge of the upper jaw and the alveolar part of the lower jaw, which is associated with the process of focal proliferation of osteoblasts. According to clinicians, an increase in the time of use of removable acrylic dentures for more than three years had an impact on the thinning of the periosteum of the alveolar part of the lower jaw, the alveolar ridge of the upper jaw and the hard palate. Research by scientists has shown that a factor such as mechanical has a constant irritating effect on the mucous membrane of the oral cavity and the neuroreceptor apparatus. This traumatic effect of the rigid acrylic base of a removable denture can increase when irregularities in the form of scratches and roughness are noted on the inner surface of the denture base; This is especially observed with poor fixing ability of the removable structure during the chewing process. There are several methods for studying the inflammatory reaction from the mucous membrane of the prosthetic bed, which is noted after the application of a removable acrylate denture. Scientific methods developed by scientists help to identify areas of overload that arise on the mucous membrane of the prosthetic bed during the early adaptation period to removable dentures, which can subsequently be eliminated.

According to scientists, removable dentures with a rigid acrylic base can cause traumatic effects on the mucous membrane under the acrylic denture base. In addition, removable dentures negatively affect thermoregulation processes in the



mucous membrane of the prosthetic bed and contribute to an increase in temperature when the mouth is closed. As a result, phenomena such as loosening of the oral mucosa, maceration and increased vascular permeability are observed. This creates favorable conditions for the penetration of acrylic polymer, residual monomer, not bound because of the polymerization process, into the bloodstream.

When reviewing the literature data, it was found that in those patients who wore acrylic removable structures, a sufficiently favorable background was constantly formed to increase the amount of opportunistic microbial flora and identify pathogenic microbial flora, which should not normally be observed. Poor hygiene of removable acrylic dentures affects the proliferation of pathogenic microorganisms such as *E. coli* (from 12 to 63%), staphylococci (11 to 22%), fungi of the genus *Candida Albicans* (10 to 32%), and enterococci. Researchers have found that the soft and hard tissues of the oral cavity are in a certain dynamic balance with the biochemical processes of the human body, influencing the preservation of tissue structure, as well as the functions of organs and systems. Acrylic polymer materials lead to disruption of this dynamic balance in the oral cavity, causing negative reactions. The presence of removable acrylic denture structures in the oral cavity leads to the development of dysbiotic changes in the oral cavity and pathological changes on the surface of the tongue, cheeks, and lips. Symptoms such as burning, pain, erosive disorders, hyperplasia and hyperkeratosis are observed. Microbiological studies of the oral cavity, studied by scientists before the stage of fixation of removable acrylic dentures and at the stages of use, showed that with increasing age of the observed patients, the microflora of the oral cavity becomes more diverse and numerous. The presence of a sufficiently large number of fungi of the genus *Candida Albicans* is analyzed, which indicates an inflammatory process. Normal microflora acts as a biological barrier and regulator of local immunity in the oral cavity, thereby positively influencing the patient's entire body. However, a decrease in the protective properties of the oral mucosa occurs due to changes in the ratio of individual types of microflora and the occurrence of pathological processes. The traumatic effect of the bases of removable acrylic structures on the soft and hard tissues of the oral cavity also affects the growth of pathogenic microflora, which is a direct causative factor in the occurrence of diseases of the oral mucosa. Such diseases include toxic and allergic stomatitis and diseases such as lichen planus, candidiasis and leukoplakia. There is information about significant proliferation of pathogenic microflora under removable acrylic basesprostheses. Along with fungi of the genus *Candida Albicans*, other representatives of the microbiota are also noted to be the causative factor in the formation of pathological changes observed on the oral mucosa.

There is evidence from clinicians that plaque on the surface of the base of a removable denture accumulates such representatives of the microbial flora as

D. Pneumoniae, Streptococcus salivarius, Streptococcus mills, Streptococcus faecialis, Klebsiella and Fusospirochetae. The greatest increase in microflora when wearing removable acrylic structures is observed in species such as Neisseria, Bacillus, Streptococcus faecialis, Leptotrix and Candida albicans.

Acrylic polymers have a direct effect on the manifestation of prosthetic stomatitis. The residual monomer, the content of which after the polymerization reaction ranges from 3 to 5% or more, influences the occurrence of the chemical-toxic effect of acrylic polymers. It is known that within one day, up to 14.0 - 17.0 mg/l of residual monomer is washed out from samples of basic acrylic polymers. Over time, the quantitative values of residual monomer migration decrease. The residual monomer is a highly toxic substance that can cause an allergic reaction in the patient's body, as well as toxic stomatitis.

In this regard, analyzing the data from the studied literature, it can be argued that poor hygiene of the oral cavity and removable acrylic dentures causes a beneficial effect on the reproduction and adhesion of conditionally pathogenic and pathogenic microflora and, as a consequence, the occurrence of oral dysbiosis. In addition, the tissues of the prosthetic bed react to the action of dental materials in the form of the development of compensatory and adaptive processes aimed at the restoration process and maintaining homeostasis of the oral cavity. Therefore, we consider it quite important to conduct research on the effect of removable acrylic dentures on the oral mucosa. Clinical and laboratory study of the effectiveness of the use of new domestic acrylic base polymers is an urgent task for rational use in order to reduce inflammatory processes in soft and hard tissues under prosthetic bases and improve the quality of prosthetics.

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基于生物反应器培养结果的牙科实验室使用的碱性消毒剂的抗菌活性  
**ANTIMICROBIAL ACTIVITY OF ALKALINE DISINFECTANTS  
USED IN THE DENTAL LABORATORY, BASED ON THE RESULTS  
OF CULTIVATION IN A BIOREACTOR**

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抽象的。 关联。 评估消毒剂对微生物群的影响并证明用于处理牙印模和假牙本身的药物选择的合理性仍然是开放的，需要仔细研究。 例如，季铵衍生物（QAD）中的化学物质对口腔微生物群代表形成的混合微生物生物膜的影响尚未得到充分研究，尽管它们具有广泛的实际用途。

目的是根据稀释程度，对多种碱性组合消毒剂（QAD 和多元醇的衍生物）对抗卫生重要微生物菌株的体外活性进行比较评估。

材料和方法。 家用消毒剂的稀释液：Megadez Ortho (VladMiva, 俄罗斯联邦)、Wendelin (Bozon, 俄罗斯联邦) 和 Trilox (Biotorg, 俄罗斯联邦) 在无菌脑心肉汤中按 1:200 至 1:200000 进行稀释，并评估微生物的生长曲线 使用 RS 生物反应器的人群。 该研究使用了3种卫生重要细菌：金黄色葡萄球菌、大肠杆菌、蜡样芽孢杆菌。

结果与讨论。 体外实验结果表明，所研究的消毒剂1:200和1:20稀释的工作液对金黄色葡萄球菌、大肠杆菌、蜡状芽孢杆菌的所有测试菌株均具有杀菌活性。 为了根除芽孢杆菌，需要比非芽孢革兰氏阳性菌和革兰氏阴性菌浓度稍高的消毒剂。

结论。 根据DS活性降低的程度， 这些药物可以按降序排列如下：“Trilox”→“Wendelin”→“Megadez-Ortho”。 Trilox 消毒剂的一个明显优势是经统计证明，其对芽孢杆菌蜡状芽孢杆菌具有更显著的活性。

关键词：抗菌活性、消毒剂、牙科、程序化培养、金黄色葡萄球菌、大肠杆菌、蜡状芽孢杆菌。

**Abstract.** *Relevance. Assessing the effect of disinfectants on the microbiota and justifying the choice of drugs for processing dental impressions and the dentures themselves remain open and require careful study. For example, the effect of chemicals from the group of quaternary ammonium derivatives (QAD) on mixed microbial biofilms formed by representatives of the oral microbiota has not been sufficiently studied, despite their widespread practical use.*

*The goal is to conduct a comparative assessment of the in vitro activity against sanitary important strains of microorganisms of a number of alkaline combined disinfectants - derivatives of QAD and polyhydric alcohols, depending on the degree of dilution.*

**Materials and methods.** *Dilutions of domestic disinfectants: Megadez Ortho (VladMiva, Russian Federation), Wendelin (Bozon, Russian Federation) and Trilox (Biotorg, Russian Federation) were prepared in sterile brain heart broth from 1:200 to 1:200000 and assessed growth curves of microbial populations using the RS bioreactor. The study used 3 strains of sanitary important bacteria: Staphylococcus aureus, Escherichia coli, Bacillus cereus.*

**Results and discussion.** *The results of the study in an in vitro experiment indicate that working solutions of the studied disinfectants in dilutions of 1:200 and 1:20 have bactericidal activity against all test strains of S. aureus, E. coli, B. cereus. To eradicate spore-forming bacilli, slightly higher concentrations of disinfectants are required than for non-spore-forming gram-positive and gram-negative bacteria.*

**Conclusion.** *According to the level of reduction in DS activity, these drugs can be arranged as follows in descending order: “Trilox” → “Wendelin” → “Megadez-Ortho”. A clear advantage of the Trilox disinfectant is its statistically proven, more pronounced activity against spore-forming bacilli B. cereus.*

**Keywords:** *antimicrobial activity, disinfectants, dentistry, programmed cultivation, S. aureus, E. coli, B. cereus.*

As is known, the risk of exposure to pathogenic and opportunistic microbiota on a dentist, dental technician working with a patient, as well as other patients seeking dental care at a given medical institution, has a significant impact on the entire algorithm for providing this care, which, in turn, requires constant improvement of the quality control and safety system for this type of medical activity [1,2,3].

Accordingly, assessing the effect of disinfectants on the microbiota and justifying the choice of drugs for processing dental impressions and the dentures themselves is a relevant and little-developed topic, and therefore requires careful study.

To solve this problem, various new disinfectants are constantly appearing on the pharmaceutical market, which reflect modern trends in import substitution. One of the most well-known groups is alkaline disinfectants based on quaternary ammonium compounds (QADs), which have not only antimicrobial but also cleaning abilities [4,5]. However, it is obvious that their activity and effectiveness as a complete means for chemical disinfection depends not only on the composition, but also on the combination of components and concentration. In particular, the issue of maintaining the full activity of disinfectants when diluted, on the one hand, and the damaging effect on impressions or metal instruments, on the other, is debatable [1,5,7,8].

The purpose of the *in vitro* experimental study is to evaluate the activity of a number of alkaline combined disinfectants - derivatives of QADs and polyhydric alcohols against sanitary strains of bacteria.

Materials and methods of research. To study antimicrobial activity *in vitro*, dilutions of domestic disinfectants (DD) were prepared: Megadez Ortho (“Vlad-Miva”, Russian Federation), Vindelin (“Bozon”, Russian Federation) and Trilox (“Biotorg”, Russian Federation). According to the instructions for use, all of the listed DD have a State registration number and comply with GOST 12.1.007-76: when administered into the stomach they belong to class 3 of moderately hazardous substances, when applied to the skin - to class 4 of low-hazardous compounds, when administered parenterally - to class 4 of low-toxicity substances; in the form of vapors when inhaled, they are low-hazardous; have a local irritant effect on the skin and a more pronounced effect on the mucous membranes of the eyes, and have a weak sensitizing effect. Working solutions of these disinfectants do not have a sensitizing effect and do not cause local irritation with single exposures. For the programmed cultivation of microorganisms in the RS bioreactor (“BioSan”), dilutions of disinfectants were made in a sterile brain heart broth from 1:200 to 1: 200,000 and the growth curves of microbial populations were assessed in real time with the automatic construction of graphs of the growth curves of bacterial populations on the display [ 6]. The study used 3 strains of sanitary important bacteria: *Staphylococcus aureus*, *Escherichia coli*, *Bacillus cereus*. The dynamics of the formation of growth curves were assessed with continuous operation of the device at 37° for 72 hours. Statistical processing of the results was carried out taking into account alignment by key points and approximation of growth data. To confirm the degree of reliability, the area under the IQR curves was graphically determined ( $p < 0.05$ ).

Results and its discussion. During the experiments, it was revealed that all test strains give typical growth curves with standard phases of a characteristic type (adaptation, logarithmic growth, stationary and regression) and key points with a maximum rise in the curve to 5.5-6 units (by optical density) during 48 hours with

no subsequent significant change across strains over an observation period of 72 hours.

When assessing the dynamics of the antimicrobial activity of DD “Megadez Ortho” against the *S. aureus* strain, it was found that at a maximum dilution of 1:200,000 DD, the parameters of the growth curves do not differ statistically significantly from the growth control, while at dilutions of 1:20,000 and 1:2000, a significant decrease in the amplitude of the growth curve at the main key points, and in dilutions of 1:200 and 1:20 no signs of growth were detected throughout the entire observation period. Similar data were obtained for the test strain *E. coli*, and in the case of using *B. cereus*, weak growth was also detected at a dilution of 1:200 to a level of 1-1.5 units, followed by complete regression after 48 hours.

When assessing the dynamics of the antimicrobial activity of DD “Wendelin” against the *S. aureus* strain, it was found that at a maximum dilution of 1:200,000, DD is statistically significantly different from the growth control with a maximum amplitude of 4-4.5 units, while at a dilution of 1:20,000 and At 1:2000, there is a significant decrease in the amplitude of the growth curve at the main key points, and at dilutions of 1:200 and 1:20 no signs of growth were detected throughout the entire observation period. Similar data were obtained for the test strain *E. coli*, and in the case of using *B. cereus* - at a dilution of 1:200000, no significant differences in amplitude were also detected. At dilutions of 1:20000 and 1:2000, there is a significant decrease in the amplitude of the growth curve at the main key points; weak growth was detected at a dilution of 1:200 to a level of 1-1.5 units, followed by complete regression after 48 hours, while only at a dilution of 1:20, no signs of growth were detected throughout the entire observation period.

When assessing the dynamics of the antimicrobial activity of Trilox DD against the *S. aureus* strain, it was found that at a maximum dilution of 1:200,000 DD, the growth curve is statistically significantly different from the growth control with maximum key points of 4.5 units, while at a dilution of 1: 20,000 there is a significant significant decrease in the amplitude of the growth curve at the main key points; in a dilution of 1:2000, the identified signs of growth were not statistically significantly different from the data obtained in dilutions of 1:200 and 1:20, where no signs of growth were detected throughout the entire observation period. Similar results were obtained for the test strain *E. coli* - in dilutions from 1:2000 to 1:20 no growth was detected at all. Finally, in the case of *B. cereus*, weak growth was detected at a dilution of 1:2000 to a level of 1.5 IU, followed by complete regression after 48 hours. Accordingly, no signs of growth were detected in dilutions of 1:200 and 1:20.

Our study expands the possibilities of comparative assessment of the activity of the listed drugs, since it allows us to study the dependence of activity on the degree of dilution under conditions of real growth of cultivated strains in a biore-

actor and to establish minimal differences in the antimicrobial effect of domestically produced disinfectants, which are justified by the use of modern methods of statistical processing of the data obtained.

New generation alkaline disinfectants are combined low-toxic but highly active preparations created over the past 5-10 years based on various combinations of QADs and polyhydric alcohols. According to the data obtained, they can have an antimicrobial effect both at the level of planktonic forms and biofilms formed on dentures and dental impressions, since the components have a fairly high penetrating ability into biofilms, which is confirmed by relevant studies, including the use of scanning electron microscopy [6,7,8].

**Conclusion.** Thus, the results obtained allow us to conclude that combined alkaline DD in dilutions of 1:200 and 1:20 have bactericidal activity against all test strains taken. To eradicate spore-forming bacilli, slightly higher concentrations of DD are required than for non-spore-forming gram-positive and gram-negative bacteria. In order of decreasing activity, these drugs can be arranged as follows: the most active “Trilox”, then “Wendelin” and the less active “Megadez-Ortho”.

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船舶用不锈钢螺旋桨叶片的特点

**FEATURES OF STAINLESS STEEL PROPELLER BLADES FOR  
MARINE VESSELS**

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抽象的。以核集装箱船“Sevmorput”号和北极供应商“Katerina Velikaya”号螺旋桨叶片损坏情况分析为例，讨论了不锈钢螺旋桨叶片的运行问题。船舶运行的最大危险是，当叶片因腐蚀磨损、气蚀或堆焊修复不当而出现表面和内部缺陷时，叶片的承载能力会因低于极限的载荷而耗尽。对由断裂后留下的受损叶片根部碎片制成的样品进行了焊接金属叶片材料（用于纠正铸造缺陷和运行修复期间）的物理、机械和金相性能分析。叶片材料微观截面的研究结果使得建立适当的断裂物理模型成为可能，并制定有关船舶不锈钢螺旋桨操作的建议。

关键词：螺旋桨、叶片、不锈钢、焊接缺陷、熔敷焊缝、断裂。

**Abstract.** *Discusses the issues of operation of propeller blades made of stainless steel, on the example of the analysis of damage to the propeller blades of the nuclear container ship “Sevmorput” and the Arctic supplier “Katerina Velikaya”. The greatest danger to the operation of the vessel is the exhaustion of its load-bearing capacity by the blade from loads less than the limit when surface and internal defects appear in the blades due to corrosion wear, cavitation or improperly performed overlay repairs. An analysis of the physical, mechanical and metallographic properties of the blade material with weld metal (used to correct casting defects and during repairs in operation) was carried out on samples made from a fragment of the root part of the damaged blade left after the break. The results of the study of micro-sections of the blade material made it possible to build an adequate physical model of fracture and formulate recommendations regarding the operation of stainless steel propellers of marine vessels.*

**Keywords:** *propeller, blade, stainless steel, weld defects, weld deposit, fracture.*

## Introduction

Marine propellers operate under severe operating conditions associated with cyclic hydrodynamic load on the blades, material operation in an aggressive environment (seawater) and ice conditions. Severe operating conditions and long-term operation determine the nature of damage associated with erosive damage from cavitation, electrochemical corrosion damage, the tendency to form and develop fatigue cracks due to the complex stress state of the blades [1, 2, 3]. Propellers should not have uncorrected casting defects; casting defects located on the discharge surface of the blade greatly reduce the corrosion-fatigue strength. Beads of welded joints should be applied especially carefully to the surface of the blade to avoid the formation of lack of fusion, hardening cracks and lack of penetration. Melting of not completely removed casting defects contributes, due to stress raisers, to accelerated crack formation, which is most typical for screws made of stainless steels. Experience in operating screws made of stainless steels for marine vessels shows that these steels are the most sensitive to stress concentrators. As a result of poorly repaired casting defects, blade breaks can occur in clean water towards the middle of the vessel's service life, after only 10-15 thousand hours of operation [4, 5].

The greatest risks for the operation of sea vessels are posed by accidents associated with damage to the propeller, the cause of which is the breakage of the blade in the most loaded root section due to insufficient overall strength.

### 1. Methods and materials

Samples of material cut from fracture areas of the preserved part of the root section of the blade were analyzed. The blade is made of steel grade 1X14NDL. The modern designation of this steel grade is 08X14H/JI. This steel grade was confirmed by a study of the chemical composition using the spectral analysis method (see table).

#### *Results of the chemical composition of the blade material*

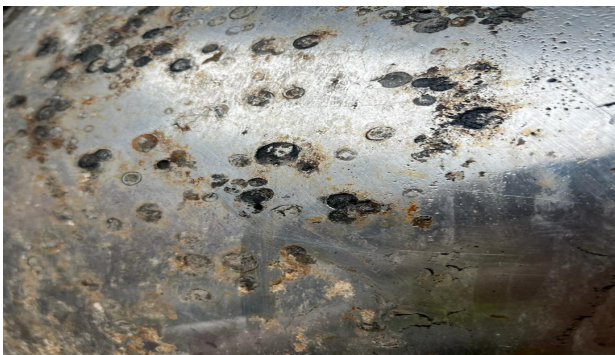
Test No.	Base: Fe	C,%	Si,%	Mn,%	Ni,%	Cr,%	Cu,%	S,%	P,%
1	85.69±0.79	>0.080	0.14±0.03	0.08±0.03	1.38±0.06	12.24±0.34	0.47±0.01	>0.040	>0.040
2	86.09±1.00	>0.080	0.20±0.04	0.08±0.02	1.32±0.15	11.96±0.35	0.35±0.03	>0.040	>0.040
3	85.40±0.89	>0.080	0.21±0.05	0.11±0.01	1.64±0.16	12.33±0.57	0.30±0.03	>0.040	>0.040

The results of visual inspection of the blades are presented in Figures 1, 2. Defects after grinding the blades are not removed and amount to residual ulcerative wear up to 5 mm in depth. Tensile testing of the strength characteristics of blade samples showed that they exceed the standard values according to TU 5.961-11056-77 and the tensile strength is more than 630 MPa.

The relative elongation of some samples (33.3%) is less than the standard value. The relative narrowing of some samples (33.3%) is also less than the standard value. The material of the blade in the area of the break has insufficient plastic properties and is prone to brittle fracture. This is also confirmed by the results



**Figure 1.** *Wear of the blade edge of the nuclear container ship “Sevmorput”*



**Figure 2.** *Wear of the blade of the Arctic supply vessel “Katherine the Great”*

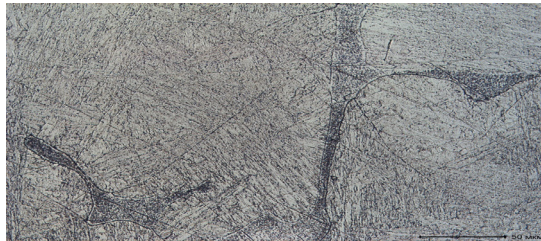
bending tests, which in our opinion is due to the increased strength of the material compared to standard values, due to the introduction into the sample of welding materials used to repair the blade. The values obtained because of research show significant heterogeneity of the mechanical properties of the welded joint and, accordingly, the stress state in the surfacing zone.

In the surfacing zone in Figure 3, corrosion damage defects are visible at the boundary of the base/welded metal zone with a macrofissure of 4.2-4.8 mm.



*Figure 3. Sample of a welded joint with corrosion damage*

Figure 4 shows the microstructure of the base metal at a magnification of 500×. The needle-like structure of martensite is clearly visible, and layers of the second phase along the grain boundaries are visible. It is very likely that this second phase (as in the HAZ) is a sigma phase with a composition close to FeCr. The appearance of the sigma phase could be due to segregation during the solidification process, due to which the last areas to solidify were enriched in chromium. It is known that the sigma phase is characterized by high hardness and brittleness. Thus, interlayers of the sigma phase along grain boundaries could have a significant impact on the behavior of the material and cause brittle fracture over time.



*Figure 4. Base metal of the blade (magnification 500×)*

## 2. Destruction model

Let us consider a model of delamination of the deposited metal of a blade weld according to the “opening crack” type [1].

To determine the external load that implements the fracture mechanism described above, we built a calculation model for determining the force  $P$  sufficient to open a crack. The value of the required force is, in essence, the lower limit of the assessment of the load-bearing capacity of the blade as a whole.

The problem under consideration is solved for the case when:

$$h/l_1 \ll 1.0 ,$$

where  $h$  is the welding height of the blade;  $l_1$  – blade deposition length.

In this case, it is believed that the asymptotic equality is valid for the change in the potential deformation energy of the blade:

$$\delta U = \left[ \frac{p^2 l_1^2}{2EJ} + \frac{\partial}{\partial l_1} \left( C \frac{p^2 l_1^2}{Eh^2 s} \right) \right] \delta l_1, \tag{1}$$

where  $s$  is the thickness of the blade;  $C$  is a constant value.

load-bearing capacity criterion:

$$\delta U = 2\gamma s \delta l_1, \tag{2}$$

where  $\gamma$  is the effective surface energy density.

From the joint solution of (1) and (2), we obtain an analytical dependence for calculating the desired force parameter:

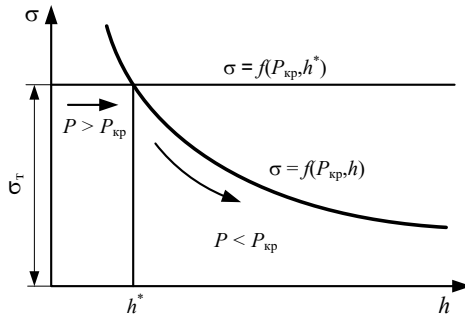
$$P = sh \frac{h}{l_1} \sqrt{\frac{1}{3} \frac{E\gamma}{h}}. \tag{3}$$

The critical value of the force  $P_{cr}$ , under the action of which the deposited metal can delaminate, is found from the condition that the acting bending stresses are equal to the yield strength of the material  $\sigma_T$ :

$$P_{kp} = \frac{1}{6} sh \frac{h}{l_1} \sigma_T. \tag{4}$$

Using formulas (3) and (4), it is possible to estimate the load-bearing capacity and predict the possible mechanism of destruction of the deposited blade.

Indeed, if the  $\sigma_T$  of the material is known, then by comparing the effective load  $P$  with the critical load  $P_{cr}$ , it is possible to establish a boundary separating the areas of possible types of failure. A graphical solution to this problem is presented in Fig. 6.



**Figure 6.** Determination of areas of destruction of the deposited blade

For the region combining low deposition heights, when  $P > P_{cr}$ , the destruction mechanism is realized only due to normal stress. In this case, the weld metal

works together with the blade. The nature of destruction is the formation of transverse cracks.

For relatively deep surfacing, when  $P < P_{cr}$ , the mechanism of propagation of a longitudinal crack in the weld will be realized. In this case, the boundary value of the cladding height, separating areas differing in the type of destruction, is the height:

$$h^* = 12E\gamma\sigma_{\text{кр}}^2. \quad (5)$$

The value of  $h^*$  for the real values included in (5) of the parameters corresponds to the deposited metal with a height of 50-70 mm, which is typical for the melting of small defects of the blade, therefore, on a broken blade, destruction occurred by delamination of the deposited weld metal with the formation and subsequent growth with the opening of a brittle cracks.

### Conclusion

The reason for the release of the sigma phase along the grain boundaries could be a violation of the technology for manufacturing and repairing the propeller blade using welding with electrodes of different classes, with different electrode potentials. As a result, areas of internal electrochemical corrosion were formed with the subsequent development of a brittle crack along the deposited weld metal, which led to the subsequent destruction of the blade under normal hydrodynamic loads in calm water.

As recommendations for the operation of stainless steel propellers, surfacing of blades should be used to a limited extent and with electrodes of identical classes. Electrodes of the austenitic or austenitic-ferritic class are recommended for limited use, only for repairing small defects. The corrosion-fatigue strength of a welded joint made with austenitic electrodes is approximately two times lower than those for martensitic electrodes and the base metal of the blade.

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手动钻床驱动操作性研究

**DRIVE OPERABILITY RESEARCH FOR MANUAL DRILL  
MACHINE**

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注解。这项工作的结果是，根据变速箱输出轴上的负载，在 Solid Works 程序中确定了分离器隔板中的应力。介绍了手电钻驱动器的台架测试结果，该驱动器基于换向器电机，功耗为 1.5 kW，额定电枢转速为 15,000 rpm，中间滚动元件的波传动传动比为 59。变速箱外壳和手柄上的驱动装置的振动水平。在电机电枢额定速度下，波动齿轮箱的效率已设定了极限值。

关键词：手持式电钻、螺旋钻、换向器电机、中间滚动元件的波传输、台架试验、振动、效率、分离器、等效电压。

**Annotation.** *As a result of the work, the stresses in the separator partitions were determined in the Solid Works program depending on the load on the output shaft of the gearbox. The results of bench tests of a manual electric drill drive based on a commutator motor with a power consumption of 1.5 kW with a rated armature rotation speed of 15,000 rpm and with a wave transmission with intermediate rolling elements with a gear ratio of 59 are presented. The vibration levels of the drive on the gearbox housing and on the handles. A limit value has been established for the efficiency of the wave gearbox at the rated speed of the motor armature.*

**Keywords:** *hand-held electric drill, auger drilling, commutator motor, wave transmission with intermediate rolling elements, bench tests, vibration, efficiency, separator, equivalent voltages.*

**Introduction**

Tomsk Polytechnic University has developed a design for a manual electric drill (ED) (Fig. 1) based on a single-phase commutator motor DK 110-1000-15U2I1 and a gearbox with intermediate rolling elements (IRE) with a gear ratio

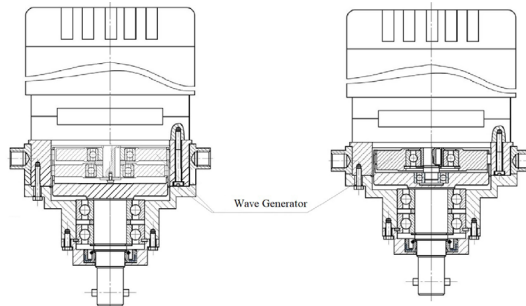


of 59 [1,2]. ED is intended for drilling holes in plastic soils with an auger working body for foundations for small buildings, for installing fence posts, conducting engineering surveys, etc.



*Figure 1. Manual electric drill machine*

Manual machines of various types and purposes are subject to increased requirements for size and weight, so reducing the values of these characteristics is an urgent task when designing new devices. A universal commutator motor has a small mass per unit of power compared to electric motors of other types [3], and a wave gearbox with intermediate rolling elements with the same gear ratio has smaller dimensions and weight compared to known types of gearboxes [4]. Thus, when combining these assembly units with each other, a competitive drive for static ED with increased torque on the working element is obtained (Fig. 2). In order to further reduce the weight and overall dimensions of the drive in the axial direction, the double-disk balanced wave generator of the wave gearbox was replaced with a single-disk wave generator, which led to the need to balance the rapidly rotating parts of the drive [5].

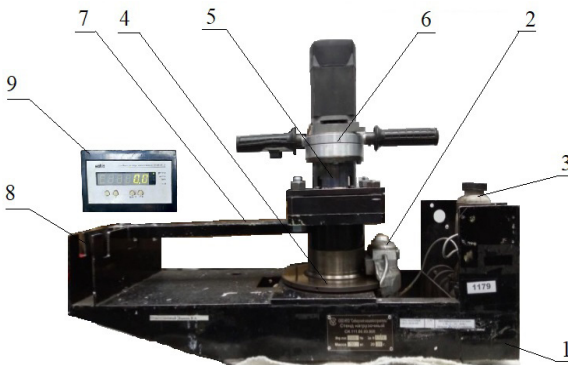


*Figure 2. Design options for a manual machine drive.*

A distinctive feature of the device is the high rotation speed of the gearbox wave generator, which in nominal operating mode is 13,000...15,000 rpm, and in idle mode can reach 24,000 rpm. The performance of a gearbox with intermediate rolling elements at such engine speeds has not been studied. There are known designs of drives with gearboxes with IRE with a wave generator rotation speed of up to 3500 rpm. Confirmation of the operability of the gearbox with IRE at high speeds of the wave generator will make it possible to create lightweight drive designs based on high-speed motors of other types, for example, pneumatic ones.

The cause of failure of a gearbox with a IRE with a loaded separator is most often a violation of the integrity of the partitions separating the rolling elements. Studying their stressed state using a modern AU system makes it possible to determine the maximum stresses that arise in them during operation of the mechanism and predict the operational properties of the gearbox. Simulation of the separator loading process in the Solid Works program [6] makes it possible to study the stressed state of the separator bridges with a sufficient level of reliability and minimal costs. It is difficult to make physical measurements of stresses in the specified elements of the part.

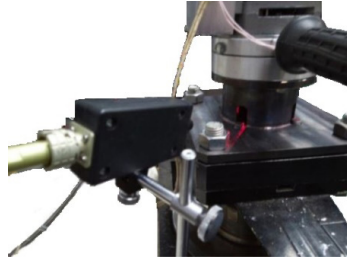
The performance of the improved device design was tested under load on a specialized stand (Fig. 3). Based on the data obtained, a forecast was made about the maximum load on the output shaft of the ED under real operating conditions and its impact on the durability of the device.



*Figure 3. Test bench*

The test bench consists of a base 1 on which a caliper 2 is installed, which is driven by a hydraulic system, the brake fluid into which comes from tank 3. The brake disc 4 is connected via a cam clutch to the drive output shaft. The adapter flange 5 is used to attach the drive of the manual machine 6 to the stand frame.

Lever 7 transmits force to sensor 8, which is connected to an electronic signal converter. The screen of device 9 displays the torque value. The pressure in the system was created by rotating the screw on the hydraulic cylinder rod.



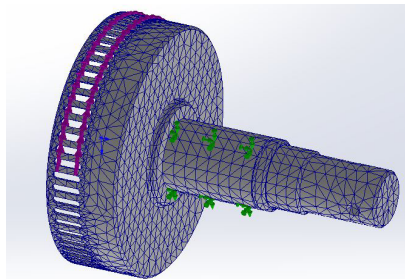
*Figure 4. Gearbox output speed sensor*

A non-contact laser speed converter (Fig. 4) recorded the rotation speed of the gearbox output shaft. The signal from the sensor was transmitted to the Diamekh 2000 Agat-M diagnostic device. A Robiton ED-2 digital wattmeter was used to measure the current, voltage in the circuit and power consumption of the drive.

### **Results and discussions**

In gearboxes with PTC, the most loaded structural elements are the separator jumpers. Therefore, to determine the level of stress in dangerous sections of these elements, a 3D model of the part was built and equivalent stresses were calculated using the Mises method using the finite element method in the Simulation module of the Solid Works program.

At the preparatory stage of the calculation, a standard medium-density mesh was created, the place for fastening the part was chosen to be a seat for rolling bearings, and the places where the load was applied were the side faces of the separator jumpers (Fig. 5).



*Figure 5. Place of fastening of the part and place of application of the load*

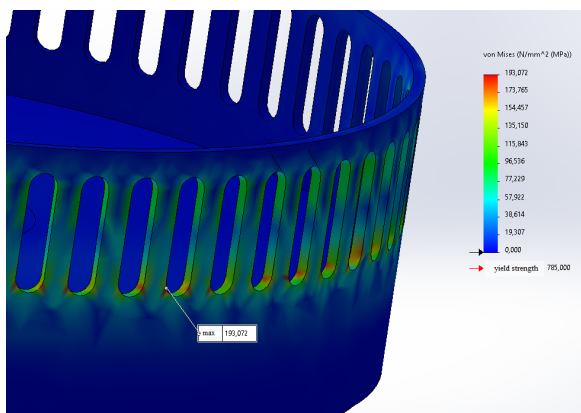
For a wave, transmission with IRE with given parameters, the transmission engagement angle is determined from equation (2) [4]. At this engagement angle of  $124.84^\circ$ , 20 out of 59 rollers transmit force to the walls of the cage.

$$X_{\Pi} = \tan \frac{\pi}{U} \cdot Y_{\Pi}, \tag{2}$$

where  $X_{\Pi}$ ,  $Y_{\Pi}$  – coordinates of the crown profile points;  $U$  – transmission ratio.

It is assumed that the force from the torque on the output shaft is distributed evenly between the loaded walls of the separator. The maximum equivalent stresses arising from a load of 45 Nm were recorded at the edges of the separator bridges located closer to the output shaft and amounted to 193 MPa.

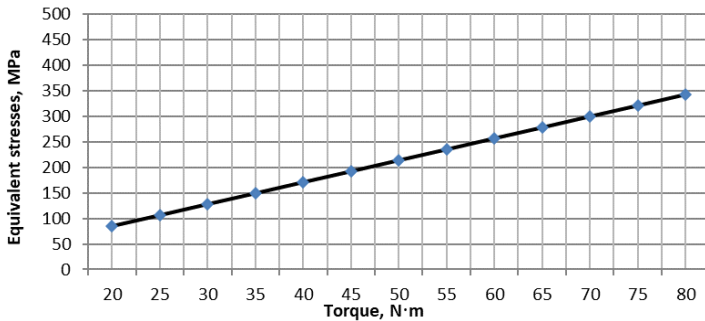
The picture of the stress distribution in the separator is shown in Fig. 6.



**Figure 6.** Stress distribution in separator bridges under a load of 45 Nm

During operation, the separator jumpers are not constantly loaded. Therefore, as the ultimate stress, we take the calculated endurance limit of the part material (steel 40X GOST 4543-2016) under a pulsating loading cycle  $\sigma = 885$  MPa. In this case, the calculated permissible stresses are 480 MPa.

Stresses in the walls of the separator in the zone of proportional deformation for steel increase linearly depending on the increase in torque on the output shaft of the gearbox (Fig. 7) [7]. In real operating conditions, the torque on the working element varies quite widely due to the uneven axial force on the working element and other factors. The graph shows that with a torque on the working element of 28...30 N·m, obtained at a rated current of 7A, the separator jumpers have a sufficient margin of safety when subjected to cyclic loading. A sharp short-term increase in torque on the working element under critical operating conditions up to 50...70 N·m does not lead to a significant decrease in the durability of the separator jumpers, since the stresses acting in them do not exceed the permissible values.

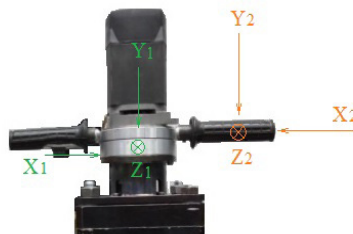


**Figure 7.** Dependence of the maximum equivalent stresses in the separator jumpers on the torque on the output shaft

The maximum efficiency of the drive and gearbox was determined under a load in the range of 4.5...45.3 N·m.

The efficiency of the commutator motor, which is used in the drive of a manual machine, in accordance with its technical characteristics is in the range of 0.62...0.65. As a result of the experiment, it was established that the drive of a manual machine is capable of developing a torque on the output shaft of up to 45 Nm, while the rotation speed of the working element drops to 170 rpm. The maximum efficiency of the gearbox with intermediate rolling elements was recorded at rated engine speed and torque and amounted to 0.68.

Vibration levels were measured at two points: on the body and on the handle, in the directions indicated in Fig. 8.



**Figure 8.** Directions for measuring vibration on a manual machine drive

The root-mean-square values of the vibration velocity of a hygienically harmless hand-held machine, measured in eight octave bands in the frequency range 11...2800 Hz, should not exceed the corresponding maximum permissible values in the range of 4.5...50 mm/s [8], and for a technically harmless one - 4.5 mm/s [9].

Vibration levels on the handles and on the gearbox housing were measured in the gearbox output shaft speed range of 110...260 rpm under load. The root mean square values of vibration velocity in various measurement planes are presented in Table 1.

**Table 1.**  
*Vibration levels of a manual electric drill drive*

No.	n, rpm	Gearbox, V mm/s			Handle, V mm/s		
		X1	Y1	Z1	X2	Y2	Z2
1.	110	6.75	10.78	6.50	6.46	13.5	5.86
2.	130	7.47	14.72	9.00	9.49	16.3	2.2
3.	150	11.21	17.50	17.91	10.6	10.84	5.28
4.	200	16.20	18.36	20.60	6.70	10.2	9.1
5.	230	17.89	20.12	22.71	7.45	11.21	9.92
6.	250	15.76	17.06	18.46	6.20	11.04	8.69
7.	260	16.42	18.19	19.38	6.84	10.47	8.46

The vibration level on the gearbox housing is slightly higher than on the drive handles. Part of the vibration is damped by the elastic shells of the handles, therefore, at the operating speed of the output shaft, the vibration velocity values on them in all directions are approximately two times less.

### Conclusion

Modeling the process of loading the separator in the Solid Works program made it possible to determine with a sufficient level of reliability that with expected cyclic loads on the working body of up to 80 Nm, the stresses arising in the jumpers of the separator do not exceed the permissible values. Therefore, a wave gearbox with intermediate rolling elements with the parameters under consideration can be used in the designs of manual machines and because of engines of higher power.

Bench tests confirmed the operability of the drive of the manual electric drill.

To confirm the reliability of the drive at the rated load on the output shaft, it is necessary to conduct durability tests.

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裂缝性多孔油藏直井气液动力学研究  
**GAS-HYDRODYNAMIC STUDIES OF VERTICAL WELLS IN  
FRACTURED POROUS RESERVOIRS**

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抽象的。目前,针对非均质油藏,特别是存在发育的裂缝系统的油藏进行了大量的研究,该裂缝系统完全或部分决定了介质的渗流特性。由于油田开发项目的有效性直接取决于储层勘探程度,因此创建和开发确定含油气地层储层性质的方法是地下气体流体动力学最重要的任务之一。本文建立了裂缝性多孔地层直井实际气体过滤的数学模型。根据地层参数对压力变化曲线及其导数进行分析。提出了一种基于直井气体流体动力学研究结果来估计裂缝性多孔地层参数的计算方法。压力恢复曲线用作初始信息。

关键词: 裂缝性孔隙地层, 井水动力测试, 真实气体, 集肤效应, 井底压力, 反问题。

**Abstract.** *Currently, a lot of research is being carried out on heterogeneous reservoirs, in particular, reservoirs in which there is a developed system of fractures that fully or partially determines the filtration properties of the medium. Since the effectiveness of field development projects directly depends on the degree of exploration of the reservoir, the creation and development of methods for determining the reservoir properties of oil and gas bearing formations is one of the most important tasks of underground gas-hydrodynamics. This article builds a mathematical model of real gas filtration to a vertical well in a fractured porous*



formation. An analysis of pressure change curves and their derivatives is carried out depending on the formation parameters. A computational method is proposed for estimating the parameters of a fractured-porous formation based on the results of gas-hydrodynamic studies of vertical wells. Pressure recovery curves are used as initial information.

**Keywords:** fractured-porous formation, hydrodynamic testing of wells, real gas, skin effect, bottomhole pressure, inverse problem.

### Statement and solution of the direct problem

Fractured-porous rocks are modeled as some complex system consisting of two media nested one within the other. The first medium consists of cracks, and the second - of low-permeability blocks. Gas exchange occurs between the first and second media. The compressibility of gas is greater than the compressibility of a fractured-porous medium, so the medium can be approximately considered non-deformable. The permeability of blocks is several orders of magnitude less than that of cracks, and therefore it is assumed that fluid filtration occurs through cracks, and the blocks feed them [1,2]. To take into account the state of the bottomhole zone, an additional stationary pressure drop on the well wall is introduced - the skin effect. One way to account for the skin effect is to use the effective well radius.

Taking into account the above assumptions, the process of radial isothermal filtration of real gas in a fractured porous formation is described as follows:

$$m_1 \frac{\partial \rho(p_1)}{\partial t} + \frac{1}{r} \frac{\partial}{\partial r} (r \rho(p_1) \mathbf{w}_1) - q = 0, \quad (1)$$

$$m_2 \frac{\partial \rho(p_2)}{\partial t} + q = 0, \quad (2)$$

where  $p_1, p_2$  – pressure in the crack and block, respectively,  $\mathbf{w}_1$  – filtration rate in a crack,  $m_1, m_2$  – porosity of cracks and blocks, respectively,  $\rho$  – gas density. The intensity of gas flow from the blocks into the crack has the form [3]:

$$q = \frac{\varpi^2 k_2}{\mu} \rho_m (p_2 - p_1), \quad (3)$$

where  $\varpi$  – specific surface area of the blocks,  $\mu$  – gas viscosity. The gas density can be represented as:

$$\rho = \rho_{st} \frac{p}{p_{st}} \frac{T_{st}}{T_e} \frac{z_{st}}{z(p)}, \quad (4)$$

where  $p_{st}, T_{st}, \rho_{st}, z_{st}$  – pressure, temperature, density and supercompressibility of gas under standard conditions,  $T_e$  – reservoir temperature, the dependence  $z(p)$  is calculated using the Latonov-Gurevich formula [4].

Taking into account (4), system (1), (2) can be written as:

$$m_1 \frac{\partial}{\partial t} \left( \frac{p_1}{z(p_1)} \right) - \frac{1}{r} \frac{\partial}{\partial r} \left( \frac{p_1}{z(p_1)} \frac{k_1}{r} \frac{\partial p_1}{\partial r} \right) - \frac{^2 k_2}{\mu} \bar{q} = 0, \quad (5)$$

$$m_2 \frac{\partial}{\partial t} \left( \frac{p_2}{z(p_2)} \right) + \frac{\varpi^2 k_2}{\mu} \bar{q} = 0, \tag{6}$$

$$\bar{q} = \frac{T_e p_{st}}{\rho_{st} T_{st} z_{st}} \rho_m (p_2 - p_1), \tag{7}$$

The gas flow to the well can be written as:

$$\left[ -2\pi H \rho r w_1 - \frac{\partial}{\partial t} (V_w \rho) \right]_{r=r_{ws}} = Q_m, \tag{8}$$

where  $Q_m$  – mass flow,  $V_w$  – wellbore volume,  $r_{ws} = r_w e^{-S}$ ,  $r_w$  – well radius, The second term of expression (8) characterizes the inflow or outflow of gas from the wellbore due to gas compressibility. Considering that the gas mass flow rate  $Q_m = Q \rho_{st}$ , expression (8) can be written as:

$$\left[ 2\pi H \frac{T_{st} z_{st}}{T_e p_{st}} \frac{p_1}{z(p_1)} \frac{k_1}{\mu} r \frac{\partial p_1}{\partial r} - C_w \frac{\partial}{\partial t} \left( \frac{p_1}{z(p_1)} \right) \right]_{r=r_{ws}} = Q, \tag{9}$$

where  $Q$  – well flow rate under standard conditions,  $H$  – formation thickness,  $C_w = V_w \frac{T_{st} z_{st}}{T_e p_{st}}$  – well volume influence coefficient.

Expression (7) depending on  $\rho_m$  can be written as:

$$\bar{q} = \left[ (1-b) \frac{p_1}{z(p_1)} + b \frac{p_2}{z(p_2)} \right] (p_2 - p_1), \tag{10}$$

where  $b$  can take values 0, 0.5 and 1.

The following notations are introduced:  $\kappa = \frac{k_1}{\mu(m_1 + m_2)}$ ,  $\omega = \frac{m_1}{m_1 + m_2}$ ,  $\lambda = \frac{\varpi^2 k_2 r_{ws}^2}{k_1}$ ,  $\sigma = \frac{k_1 H}{\mu}$ . Then system (5), (6) and (9) can be written as:

$$\frac{\omega}{\kappa} \frac{\partial}{\partial t} \left( \frac{p_1}{z(p_1)} \right) - \frac{1}{r} \frac{\partial}{\partial r} \left( \frac{p_1}{z(p_1)} r \frac{\partial p_1}{\partial r} \right) - \frac{\lambda}{r_{ws}^2} \bar{q} = 0, \quad r \in (r_{ws}, r_e), \quad t > 0, \tag{11}$$

$$\frac{(1-\omega)}{\kappa} \frac{\partial}{\partial t} \left( \frac{p_2}{z(p_2)} \right) + \frac{\lambda}{r_{ws}^2} \bar{q} = 0, \quad r \in [r_{ws}, r_e), \quad t > 0, \tag{12}$$

$$p_1(r, 0) = p_2(r, 0) = p_e, \quad r \in [r_{ws}, r_e), \quad t > 0, \tag{13}$$

$$p_1(r_e, t), p_2(r_e, t) = p_e, \quad t > 0, \tag{14}$$

$$\left[ 2\pi \frac{T_{st} z_{st}}{T_e p_{st}} \frac{p_1}{z(p_1)} \sigma \frac{\partial p_1}{\partial r} - C_w \frac{\partial}{\partial t} \left( \frac{p_1}{z(p_1)} \right) \right]_{r=r_{ws}} = Q, \quad t > 0, \tag{15}$$

where  $p_e$  – reservoir pressure. The value  $\lambda$  expresses the intensity of flow from blocks into cracks, and  $\omega$  the ratio of the elastic gas reserve of cracks to the total reserve.

To numerically solve the boundary value problem (11)-(15), the finite difference method is used. The solution area is covered with an uneven mesh, which becomes denser towards the well. The construction of such a grid is carried out using coordinate transformation  $u = \ln r$  [6].

To discretize the system of differential equations (12)-(16) in the region

$$\Omega = \{u, t : \ln r_{ws} = u_{ws} \leq u \leq u_e = \ln R_e, 0 \leq t\}$$

grids of nodes are introduced:

$\omega_h = \{u_i : u_i = u_1 + h, h = (u_N - u_1)/(N_u - 1), i = \overline{1, N_u}\}$ ,  $\omega_\tau = \{t_j : \tau_j = t_j - t_{j-1}, j = \overline{1, N_\tau}\}$ , is considered to be  $p_1(u_i, t_j) = p_{1ij}$ ,  $p_2(u_i, t_j) = p_{2ij}$ ,  $z(p_{1ij}) = z_{1ij}$ ,  $z(p_{2ij}) = z_{2ij}$ . Then the difference scheme for system (11)-(15) has the form:

$$\frac{\omega}{\kappa} \left( \frac{p_{1ij} - p_{1ij-1}}{z_{1ij} - z_{1ij-1}} \right) \frac{1}{\tau_j} = \frac{1}{e^{2u_i} h^2} [a_{ij}(p_{1i+1j} - p_{1ij}) - a_{i-1j}(p_{1ij} - p_{1i-1j})] + \frac{\lambda}{r_{ws}^2} \bar{q}_{ij}, \quad i = \overline{2, N_u - 1}, \quad j = \overline{1, N_\tau},$$

$$\frac{(1 - \omega)}{\kappa} \left( \frac{p_{1ij} - p_{1ij-1}}{z_{1ij} - z_{1ij-1}} \right) \frac{1}{\tau_j} = -\frac{\lambda}{r_{ws}^2} \bar{q}_{ij}, \quad i = \overline{2, N_u - 1}, \quad j = \overline{1, N_\tau},$$

$$p_{1i0} = p_{2i0} = p_e, \quad i = \overline{1, N_u},$$

$$\left[ 2\pi\sigma \frac{T_{st} z_{st} a_{1j}}{T_e p_{st} h} (p_{12j} - p_{11j}) - \frac{C_w}{\tau_j} \left( \frac{p_{11j}}{z_{11j}} - \frac{p_{11j-1}}{z_{11j-1}} \right) \right] = Q, \quad j = \overline{1, N_\tau},$$

$$p_{1N_u j} = p_{2N_u j} = p_e, \quad j = \overline{1, N_\tau},$$

$$\bar{q}_{ij} = \left[ (1 - b) \frac{p_{1ij}}{z_{1ij}} + b \frac{p_{2ij}}{z_{2ij}} \right] (p_{2ij} - p_{1ij}), \quad a_{ij} = \frac{2y_{ij} y_{i+1j}}{y_{ij} + y_{i+1j}}, \quad y_{ij} = \frac{p_{1ij}}{z_{1ij}}.$$

The resulting system of difference equations at each time layer is solved by the iteration method.

Analysis of pressure curves and their derivatives

Model examples are used to study the influence of formation filtration parameters on pressure change curves and their derivatives at the bottom of a well after its commissioning. A model reservoir with the following data is considered:  $r_w = 0.1$  m,  $R_e = 500$  m,  $S = 1$ ,  $H = 10$  m,  $V_w = \pi r_w^2 L$ ,  $L = 1000$  m,  $Q = 2.5 \cdot 10^5$  m<sup>3</sup>/day,  $p_e = 20$  MPa,  $T_e = 300$  K,  $T_{st} = 293$  K,  $k_1 = 0.01$  μm<sup>2</sup>,  $k_2 = 10^{-5}$  μm<sup>2</sup>,  $\omega = 1$  m<sup>-1</sup>,  $\mu = 0.01$  MPa s,  $\sigma = 10$  (μm<sup>2</sup> M)/(MPa s),  $\lambda = 10^{-5}$ ,  $\omega = 0.1$ ,  $\kappa = 5$  μm<sup>2</sup> m/(MPa s).

In Fig. 1 shows pressure change curves and their derivatives depending on the parameter  $\lambda$ , on fig. 2 – depending on the parameter  $\omega$  in logarithmic coordinates, taking into account the influence of the wellbore volume. On the curves of pressure derivatives there is a “gully” characteristic of fractured-porous media. The parameter  $\lambda$  affects the location of the “ravine” on the derivative curve along the time axis (Fig. 1), and  $\omega$  - the depth (Fig. 2). The effect of large parameter values  $\lambda$  and small parameter values  $\omega$  on the pressure derivative curve is hidden by the wellbore volume effect.

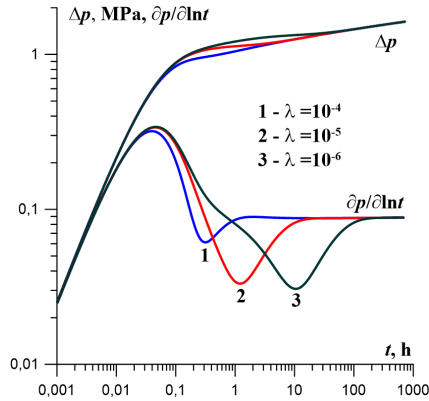


Figure 1. Pressure change curves and their derivatives.  $S = 0$ .  $\omega = 0.1$ .

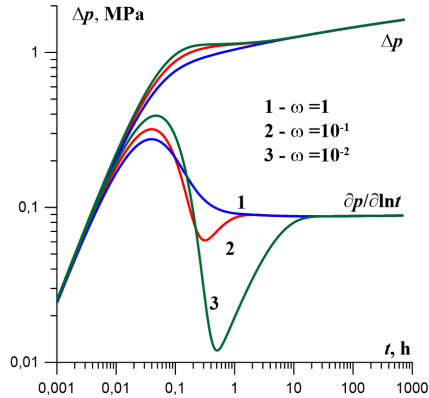


Figure 2. Pressure change curves and their derivatives.  $S = 0$ .  $\lambda = 10^{-5}$ .

**Statement and solution of the inverse problem**

Determining the filtration properties of a fractured-porous formation based on the results of hydrodynamic studies of vertical wells belongs to the class of inverse problems of mathematical physics. The inverse problem consists of determining the coefficients  $\sigma$ ,  $\lambda$ ,  $\omega$ ,  $\kappa$ ,  $S$  and  $C_w$ , when the process of fluid filtration to a vertical well in a fractured porous formation is described by a system of equations (11)-(15). As initial information, the values of pressure  $\phi(t)$  measurements taken by a downhole instrument at the bottom of the well after its start-up or shutdown are used:

$$p_1(r_w, t) = \phi(t), \quad 0 \leq t \leq t_{exp}. \tag{16}$$

The solution to the inverse problem (11)-(16) comes down to minimizing the following functional [Shamsiev Gadilshina]:

$$F(\theta) = \int_0^{t_{exp}} [\phi(t) - p(r_w, t)]^2 dt, \quad (17)$$

where  $\theta = (\sigma, \lambda, \omega, \kappa, S, C_w)$ ,  $0 < a_i \leq \alpha_i \leq b_i$ ,  $a_i, b_i = const$ . The iterative sequence for minimizing the functional (17) is constructed based on the Levenberg-Marquardt method. The convergence and stability of the solution to the inverse problem is studied using model examples. For given vector values,  $\theta_i^{abs}$  the direct problem (11) – (15) is solved. Errors within 0.1 MPa are randomly introduced into the pressure change data obtained from solving the direct problem. Next, the curves with introduced errors are used as initial information when solving the inverse problem.

Below are the results of one of the typical calculations for  $S > 0$ . In Fig. Figure 3 shows the convergence process of the iterative process. The iterative process converges in 15-20 steps. Similar calculations were carried out for  $S < 0$ . From the results obtained it follows that the proposed computational algorithm for interpreting hydrodynamic studies of wells is stable with respect to errors in the initial information and allows one to estimate the parameters of a fractured-porous formation from the curves of changes in bottomhole pressure.

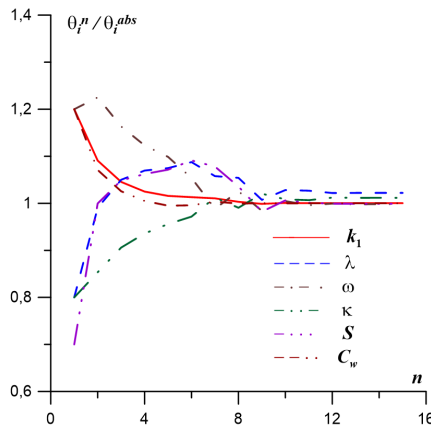


Figure 3. Iterative process of minimizing the functional (17).

### Conclusion

In this work, a mathematical model of real gas filtration to a vertical well in a fractured porous formation is constructed, taking into account the influence of the wellbore volume and skin factor. An analysis of the pressure change curves at the bottom of the well and their derivatives depending on the formation parameters

was carried out. A method for interpreting the results of gas-hydrodynamic studies of vertical wells penetrating fractured-porous formations is proposed, based on the theory of solving inverse problems. The method allows you to estimate the capacitance and filtration parameters of the formation by measuring changes in bottomhole pressure after starting or stopping a well.

The study was supported by a grant from the Russian Science Foundation No. 23-19-00144 (<https://rscf.ru/project/23-19-00144/>).

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DOI 10.34660/INF.2024.85.12.030

利用DNA标记识别、保存和开发西门塔尔品种的遗传资源  
**USING DNA MARKERS TO IDENTIFY, PRESERVE AND DEVELOP  
THE GENETIC RESOURCES OF THE SIMMENTAL BREED**

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抽象的。在人类历史的大部分时间里，人类都是无意识地选择动物，直觉地关注感兴趣的特征。通常，选择权落在牛群中最大的动物身上。仅仅几个世纪后，人们就证明了这些个体中哪些人是最强壮、最顽强、最能抵抗疾病的。

到了 17 世纪，人们已经可以积累足够的动物技术信息，开始根据预先计划的选育计划培育新品种的农场动物。最流行的方法是近亲繁殖——使有血缘关系的动物杂交。

起初，无系统的近亲繁殖造成了很大的伤害，导致动物的健康状况和生育能力下降。然而，到了 19 世纪末，育种者能够识别出大多数导致退化的错误。从这一刻起，它就被积极地用来巩固必要的遗传特征。动物选择的目的不仅是为了巩固合适的特征，而且是将它们从一个品种转移到另一个品种。这就是杂交的产生方式——将具有理想特征的个体杂交并选择它们进行后续固定的原理。

自20世纪中叶以来，遗传学在选择的发展中发挥了重要作用。已经创建了研究遗传性、变异性、基因型评估以及性状遗传相关性的方法。如今，它们已成为现代育种的基础，使人们能够提前预测某些性状的出现。

现代科学使用各种方法来培育新品种的动物。新的动物选择方法也正在开发中，其中最具有前途的是细胞工程。目前，育种者正在努力培育具有与其祖先相同品质的克隆。

在我国，对种畜起源进行遗传控制是牛、马、猪、绵羊、山羊品种有效育种工作的前提。在评估动物的育种价值时，必须考虑其来源的遗传纯度，作为成功解决育种问题的保证。

关键词: DNA 标记, 西门塔尔品种, 标记鉴定。

**Abstract.** *For most of its history, humans selected animals unconsciously, intuitively focusing on traits of interest. Often the choice fell on the largest animals*

*in the herd. And only centuries later it was proven which of these individuals are the strongest, hardiest and best resistant to disease.*

*By the 17th century, it was possible to accumulate a sufficient amount of zootechnical information to begin breeding new breeds of farm animals according to a pre-planned program of selection and selection. The most popular method has become inbreeding - crossing animals that are related by blood.*

*At first, unsystematic inbreeding caused a lot of harm, leading to a decrease in the health of animals and their fertility. However, by the end of the 19th century, breeders were able to identify most of the errors leading to degeneration. From this moment on, it is actively used to consolidate the necessary genetic characteristics. The purpose of animal selection was not only to consolidate suitable characteristics, but also to transfer them from one breed to another. This is how hybridization arose - the principle of crossing individuals with desirable characteristics and their selection for subsequent fixation.*

*Since the mid-20th century, genetics has played a major role in the development of selection. Methods have been created for studying heritability, variability, genotype assessment, as well as genetic correlation of traits. Today they are the basis of modern breeding, allowing one to predict in advance the appearance of certain traits.*

*Modern science uses a full range of methods for breeding new breeds of animals. New methods of animal selection are also being developed, the most promising of which is cell engineering. Currently, breeders are working on growing clones that could have the same qualities as their progenitor.*

*In our country, genetic control of the origin of breeding animals is a prerequisite for effective breeding work with breeds of cattle, horses, pigs, sheep and goats. When assessing the breeding value of an animal, the genetic purity of its origin must be taken into account, as a guarantee of the successful solution of breeding problems.*

**Keywords:** *DNA markers, Simmental breed, identification using markers.*

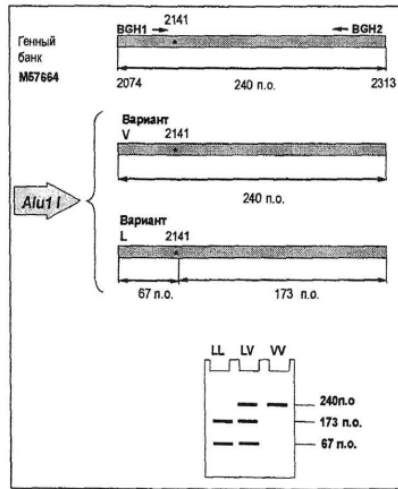
**Research methodology:** the study was carried out on three different genetic groups of Simmental breed cows (Simmental of domestic selection, n=85), Simmental of Austrian selection (n=115), Simmental of the improved type (n=100) and a group of animals of the Holstein red-and-white breed. Tissue samples (ear plucks) were collected from the animals. Preservation of samples (ear plucking, sperm) was carried out according to the method of N.A. Zinovieva. (2002).

DNA extraction was carried out according to the methods described by N.A. Zinovieva. et al. (1998) and Gladyr E.A. et al (2000). Genotyping of animals for the kappa-casein (CSN3), beta-casein (CSN2) and alpha-lactalbumin (LALBA) genes was carried out according to methods developed in the laboratory of molec-



ular genetics and animal cytogenetics[1, 2, 3, 4]. The genotypes of animals for the growth hormone gene (BGH) were determined according to the method developed by [3]. Data on milk productivity of cows for 305 days of the first lactation were obtained from breeding registration cards.

**Own research:** PCR-RFLP analysis was carried out according to standard methods [4, 5]. After separation, depending on the genotype of the animal, fragments of 240, 173 and 67 bp in length are formed, with a fragment of 240 bp in length. corresponds to allele V, and fragments 173 and 67 bp long. correspond to the L allele (Fig. 1).



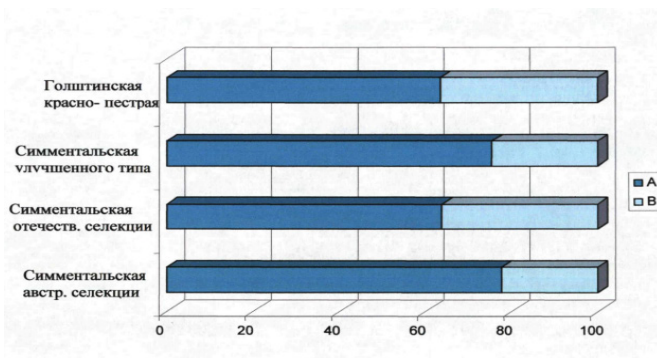
**Figure 1.** Scheme of PCR-RFLP analysis of alleles L and V of the BGH gene in cattle

Diagnosis of BGH gene polymorphism based on PCR-RFLP analysis is easy to perform and has good reproducibility of results. It can be successfully used for testing cattle as part of population genetic studies, for studying genetic diversity, and also as a possible marker for quantitative trait loci.

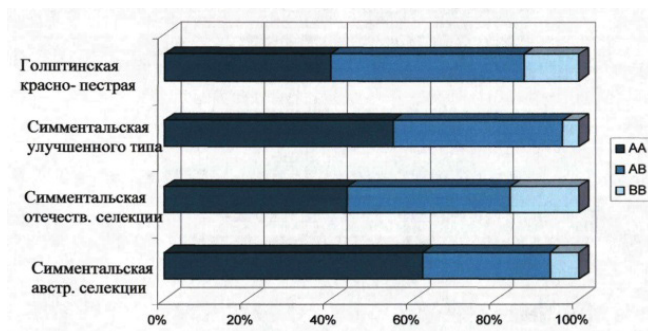
Various molecular genetic methods make it possible to diagnose genes directly or indirectly associated with economically useful traits, and also allow, in addition to selection for milk yield, fat and protein content, selection by genotypes. Diagnosis of kappa-casein gene variants was carried out using the two most common alleles A and V.

The frequency of occurrence of the desired allele B was noted in the group of animals of the Holstein red-and-white breed (36.7%) and in the population of purebred Simmental cows of domestic selection (36.3%). Also, a high frequency

of occurrence of allele B is observed in the group of cows of the Simmental breed of improved type - 24.5%. The highest frequency of occurrence of the BB genotype among the studied groups of animals was observed in purebred Simmental cows of domestic selection (16.67%).



a)



b)

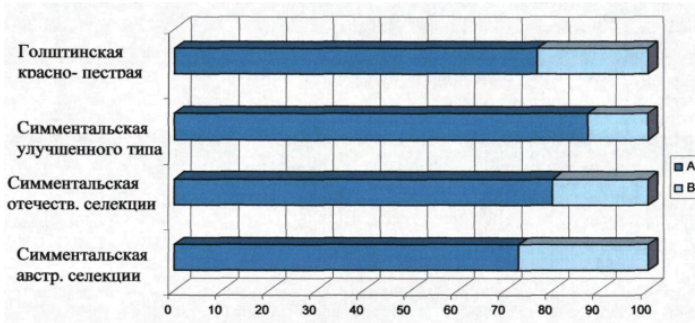
**Figure 2.** Frequency distribution of alleles (a) and genotypes (b) of CSN3

The conducted studies showed the presence of noticeable differences in the frequencies of the A CSN3 allele between cows of domestic selection and improved type ( $P < 0.05$ ), as well as between cows of domestic and Austrian selection ( $P < 0.01$ ). In terms of the occurrence of genotypes, a significant difference was noted only between groups of cows of domestic and Austrian selection ( $P < 0.001$ ).

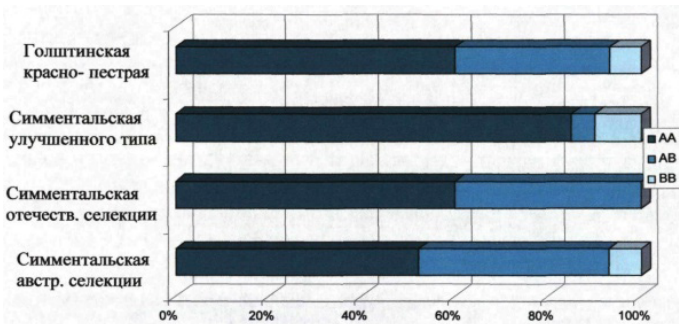
Figure 2 shows the results of animal analysis for LALBA gene variants. Analyzing the data in Figure 4, it is necessary to note the highest frequency of occurrence of the A LALBA allele in improved type cows (87.5%). The lowest frequency of occurrence of the A allele was characteristic of purebred cows of Austrian

selection (72.6%). An analysis of the frequencies of occurrence of LALBA genotypes shows that the highest frequency of occurrence of the AA genotype was detected in the group of improved type cattle (85.0%), and the lowest in cows of Austrian selection (52.2%).

It should be noted that between the groups of Simmental purebred cows of Austrian selection, domestic selection and animals of the improved type of the Simmental breed, there was no significant difference in the frequencies of occurrence of the A allele and the homozygous genotype AA, with the exception of differences in the frequency of occurrence of the AA genotype in animals of domestic selection and improved type (The highest frequency of occurrence of allele A was in cows of the Simmental breed of improved type (87.5%). The lowest frequency of occurrence of allele A was characterized by purebred cows of the Simmental breed of Austrian selection (72.6%).



a)



b)

Figure 3. Distribution of frequencies of alleles (a) and genotypes (b) LALBA

Thus, our studies indicate that the infusion of Holstein cattle leads to an increase in the frequency of occurrence of the A allele and the AA genotype.

In populations of purebred Simmental cattle of domestic selection, Holsteinized Simmental cattle and red-and-white Holstein breeds, preservation of gene balance at the CSN2 locus is observed. And in the population of the purebred Simmental breed of Austrian selection, a shift in the gene balance towards an increase in the homozygous BB genotype is observed.

In the cow of the improved type of the Simmental breed, the allele frequency distribution occupies an intermediate position. In these animals, a decrease in the frequency of occurrence of allele A is observed. In cows of the domestic selection of the Simmental breed, allele B was not detected.

With the influx of blood from the Holstein red-and-white breed, a decrease in the proportion of homozygous AA genotypes was noted in cows of the improved type. No cows with the BB genotype were identified among the studied animals of domestic selection.

The difference between the frequency of occurrence of the A allele, as well as the AA genotype, between groups of purebred cows of Austrian and domestic selection and cows of the improved type of Simmental breed was not statistically significant.

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DOI 10.34660/INF.2024.22.92.031

橡树白粉病对天然橡林更新的影响  
**THE INFLUENCE OF OAK POWDERY MILDEW ON NATURAL  
OAK FOREST REGENERATION**

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抽象的。研究了橡树白粉病在保护自播橡树方面的作用以及形成可靠的林下植被的潜力。值得注意的是，在白粉病病原体于20世纪初在俄罗斯橡树林中出现之前，自种的橡树可以存活10-15年，但如果不持续有利的生长条件，就会枯死。如果母树的树冠下有足够的光照，橡树就会发育出林下层，随后形成年轻的森林一代。目前，由于白粉病的感染量很高，自播的橡树在第一年就死亡，只有少数植物能存活到第三年。这种疾病的进展导致橡树林世代演替的自然过程发生变化。

关键词：橡树，橡树白粉病，自播树，橡树林的代际变化。

**Abstract.** *The role of oak powdery mildew in the preservation of self-sown oak trees and the potential for forming a reliable understory is examined. It is noted that prior to the appearance of the powdery mildew pathogen in the early 20th century in Russian oak forests, self-sown oak trees could survive for 10-15 years but would perish if favorable growth conditions did not persist. In cases where sufficient light under the canopy of the parent stand allowed, the oak tree would develop an understory and subsequently a young forest generation. Currently, due to a high infection load of powdery mildew, self-sown oak trees die in the first year of life, with only a few plants surviving to the third year. Such disease progression leads to changes in the natural process of generational succession in oak forests.*

**Keywords:** oak, oak powdery mildew, self-sown trees, generational change in oak forests.

Oak powdery mildew (causal agent *Erysiphe alphitoides* (Griffon & Maubl.) U. Braun & S. Takam.) was first discovered in Russian forests in 1909 (Vlasov, 1955). Since then, this pathogen has spread throughout all territories in the European part of the country where pedunculate oak (*Quercus robur* Linneaus, 1753) grows (Kuzmichev et al., 2004).

It is believed that oak powdery mildew does not have a significant impact on the condition of oak forests and the natural regeneration of oak trees. However, recent studies on the state of self-sown oak trees in some forest stands (Yatchenko, Borisova, 2015) have shown that it has a strong influence on their survival under the canopy. Many researchers studying the natural regeneration of oak trees have noted the poor condition of self-sown trees and young understory (Kalugina, 2006; Matveeva, 2008; Yeruslimsky, Vlasenko, 2011), but they usually do not specify the reasons leading to the death of the young oak generation.

Foresters know that self-seeding oak is usually not long-lived because in order to develop into a healthy adolescent and then mature into a forest stand, it needs light, which is deprived by the maternal canopy. The founder of Russian forestry, G.F. Morozov, describes these relationships in his "Doctrine of the Forest" (1949) as follows: "Self-seeding of this species, appearing under the canopy of the maternal stand, due to the photophilous nature of the oak, usually can survive only 2-3 years. Instead, however, of the dying shoot from a dormant bud, a new shoot grows, which again lives no more than 2-3 years, also dies and is replaced by a new shoot from another dormant bud. This abundance of dormant buds, conditioning the rich coppicing ability of the oak, also plays a significant role in the struggle of oak saplings with the maternal stand. Only near the edges and generally in places where there is lateral access to light, oak self-seeding can normally, without periodic dying and rejuvenation, develop into an adolescent. However, in conditions of lack of lateral light due to overhead shading, not in the optimum growth conditions, as in our conditions, self-seeding oak acquires a certain resistance under the canopy of the stand only thanks to dormant buds and the outlined procedure. It has been observed that such a struggle of its self-seeding with the maternal stand can continue for 10-15, or perhaps even more years."

Thus, it can be concluded that in the process of natural generational change in oak forests, self-seeding always perished in huge quantities, failing to develop into a full-fledged adolescent and then into the main forest stand. The picture described by G.F. Morozov shows that due to the lack of light, self-seeding could not develop but maintained viability for many years.

In the present day, it has been noted (Borisova, Yatchenko, 2015) that in forest stands involving oak in the territory of the Forest Experimental Station (FES) of Timiryazev Agricultural Academy, self-seeding oak mostly does not survive until the second year, and those that do survive until the spring of the second year perish completely before reaching the third year.

We managed to find data in the archives of FES on the condition and preservation of oak saplings in a trial plot in square 14, with an area of 0.1366 hectares, starting from 1909. By this time, the considered sapling reached a stem thickness of 4 cm, which corresponds approximately to an age of 5-6 years. This means that the self-seeding appeared even before the penetration of the powdery mildew pathogen into the territory of Russia. In 1909, 171 plants were recorded in this trial plot, which, recalculated per hectare, amounted to 1252 young oak specimens. In 1955, when observations on this trial plot were completed, there were 54 oaks growing on it (395 trees per hectare), aged about 50-60 years, with prevailing diameters of 20-28 cm (table 1).

**Table 1.**  
*Changes in the number of oak trees in the trial plot*

stem diameter, cm	Distribution of the number of oak trees by diameter classes in the years of observation, pcs.												
	1909	1912	1914	1917	1921	1923	1925	1930	1937	1938	1944	1950	1955
4	165	149	39	21	6	0	0	0	0	0	0	0	0
8	6	36	50	52	47	22	9	2	0	0	0	0	0
12		6	16	23	38	39	37	32	9	2	0	0	0
16			1	4	15	14	23	32	27	13	7	2	1
20					2	5	8	11	27	7	24	18	13
24								5	5	0	13	19	23
28									7	1	7	9	11
32											3	5	4
36												1	2
total	171	191	106	100	108	80	77	82	75	23	54	54	54

Thus, in the trial plot under conditions of complete absence of powdery mildew by the age of 5-6 years, a sufficient number of plants were growing to form an oak forest stand with fully normal characteristics in terms of tree size (Chernykh et al., 2006). However, at present, no plant survives until the age of 5-6 years. The majority of oak seedlings perish within the first year of life, and those that survive the first year die before reaching their third year.

Therefore, earlier self-seeding oak experienced significant difficulties in the first years of life, and a significant portion of it perished before reaching the age of 10 years. There was no indication found of the causes of plant death at that time.

Simply assuming that the plant died due to lack of light and competition with the maternal canopy is incorrect, as each living organism's death has a specific cause. Apparently, the plants weakened due to insufficient illumination were affected by some fungal pathogens and perished.

After the appearance of the fungus *Erysiphe alphitoides* in forest communities of the European part of Russia, it rapidly began to destroy seedlings. In conditions of very high infection load, seedlings perish from powdery mildew, and other pathogenic micromycetes currently have no significant influence on the survival of the juvenile generation of oak. Therefore, with the appearance of powdery mildew in Russian oak forests, it had a significant impact on the biodiversity of micromycetes, which previously served as the cause of seedling decay and self-seeding, and now it has a significant influence on the natural course of oak generational succession.

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DOI 10.34660/INF.2024.95.97.032

人工智能在农业中的应用：提高效率、可持续性和产品质量  
**THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN  
AGRICULTURE: IMPROVING EFFICIENCY, SUSTAINABILITY,  
AND PRODUCT QUALITY**

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抽象的。 本文探讨了人工智能 (AI) 在农业中的应用。 它讨论了人工智能用于提高农业生产效率和可持续性的各种方式, 例如产量预测、灌溉优化、植物病害检测和病虫害防治。

关键词: 人工智能、农业、产量预测、灌溉、植物病害、害虫。

**Abstract.** *This article examines the application of artificial intelligence (AI) in agriculture. It discusses various ways AI can be used to improve the efficiency and sustainability of agricultural production, such as yield prediction, irrigation optimization, plant disease detection, and pest control.*

**Keywords:** *artificial intelligence, agriculture, yield prediction, irrigation, plant diseases, pests.*

### **Introduction**

Agriculture is one of the most important sectors of the economy, providing the population with food. With a growing population and climate change, agriculture is faced with the challenge of producing more food using fewer resources. Artificial intelligence (AI) can help address this challenge by improving the efficiency and sustainability of agricultural production.

This article examines various ways AI can be used in agriculture, such as yield prediction, irrigation optimization, plant disease detection, and pest control. It also discusses the impact of AI on the agricultural industry as a whole, as well as the challenges and opportunities for its application.

### **Main Body**

#### **Applications of AI in Agriculture**

AI can be used in agriculture to address a variety of tasks, including:

- **Yield prediction:** Using data on weather, soil conditions, and other factors, machine learning algorithms can predict crop yields with high accu-

racy. This allows farmers to make more informed decisions about planting, fertilizing, and harvesting.

- **Irrigation optimization:** Sensors and machine learning algorithms can be used to determine when and how much water crops need. This allows farmers to reduce water consumption and increase yields.
- **Plant disease detection and pest control:** Machine learning algorithms can be trained to recognize signs of diseases and pests in images of plants. This allows farmers to identify problems early and take steps to address them before they cause significant damage to crops.
- **Farm machinery management:** Robots and drones can be used to perform various tasks, such as planting, spraying, and harvesting.
- **Soil health monitoring:** Sensors and machine learning algorithms can be used to monitor soil health and identify problems such as nutrient deficiencies.
- **Plant breeding:** AI can be used to analyze genetic data and develop new crop varieties that are more resistant to diseases, pests, and climate change.

The industry is turning to artificial intelligence technologies to help grow healthier crops, control pests, monitor soil and growing conditions, organize data for farmers, assist with workload, and improve a wide range of agriculture-related tasks across the entire food supply chain.

**Weather Prediction Utilization:** With changing weather patterns and increasing pollution, farmers find it difficult to determine the right time to plant seeds. With the help of artificial intelligence, farmers can analyze weather conditions using weather predictions that help them plan which crops can be grown and when they should be grown.

**Soil and Crop Health Monitoring System:** The type of soil and its nutrients play a vital role in determining the type of crop grown and its quality. Due to increased deforestation, soil quality is degrading, and it is difficult to determine the quality of the soil.

#### **Benefits of Using AI in Agriculture**

The application of AI in agriculture has several benefits, including:

- **Increased efficiency:** AI can help farmers optimize the use of resources such as water, fertilizers, and pesticides.
- **Increased yields:** AI can help farmers identify and address problems that can reduce yields.
- **Reduced losses:** AI can help farmers detect plant diseases and pests early, which can reduce crop losses.
- **Improved product quality:** AI can help farmers produce higher quality products that meet consumer demands.
- **Reduced labor burden on farmers:** AI can automate many tasks performed by farmers, freeing up their time for other tasks.

### Impact of AI on the Agricultural Industry

The application of AI in agriculture can have a significant impact on the industry as a whole. Here are some of the potential consequences:

- **Increased productivity:** AI can help farmers produce more food at a lower cost. This can lead to lower food prices and increased food availability for consumers.
- **Improved product quality:** AI can help farmers produce higher quality products that meet consumer demands.
- **Reduced environmental impact:** AI can help farmers optimize the use of resources such as water, fertilizers, and pesticides. This can lead to a reduced environmental impact of agriculture.
- **Changes in the labor market:** AI can automate many tasks performed by farmers, which could lead to job losses in agriculture. However, AI can also create new jobs in areas such as AI technology development and maintenance.

AI-powered Pest Detection System: Pests are one of the worst enemies of farmers, damaging crops. AI systems use satellite images and compare them with historical data using AI algorithms and determine if any insect has landed and which insect has landed, such as locusts, grasshoppers, etc. And they send alerts to farmers on their smartphones so that farmers can take the necessary precautions and use the necessary pest control measures, so AI helps farmers fight pests.

### Challenges and Opportunities

Despite its great potential, the application of AI in agriculture also faces some challenges. Here are some of the key challenges that need to be addressed:

- **High cost of technology:** Some AI technologies can be expensive for farmers.
- **Need for training:** Farmers need to be trained to use AI technologies.
- **Data access:** AI algorithms require access to large amounts of data to function effectively.
- **Ethical and safety concerns:** There are ethical and safety concerns associated with the use of AI in agriculture, such as issues related to data privacy and potential job losses.

Despite these challenges, the use of AI in agriculture is growing rapidly. As technology develops and costs decrease, AI is likely to play an even more important role in agriculture in the future.

### Conclusion

AI has enormous potential to transform agriculture. By using AI, farmers can improve the efficiency and sustainability of their production, as well as produce higher quality products. However, in order for AI to realize its potential in agriculture, a number of challenges need to be addressed, including the high cost of technology, the need for training, and ethical and safety concerns.

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DOI 10.34660/INF.2024.89.31.033

原工业企业用地的开发和现代化利用特点  
**FEATURES OF DEVELOPMENT AND ADAPTATION FOR  
MODERN USE OF TERRITORIES OF FORMER INDUSTRIAL  
ENTERPRISES**

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**摘要.** 本文重点讨论了前工业企业土地的开发和适应现代用途的特点，这些企业占据了昂贵的地块，而且通常还保留着处于可接受状态的具有有趣建筑品质的建筑物。考虑了前工业建筑和领土的主要发展方向。

**关键词:** 改造、工业设施、景观美化、与城市融合。

**Abstract.** *The article focuses on the features of development and adaptation for modern use of the territories of former industrial enterprises, which occupy expensive land plots, and also often have buildings remaining in an acceptable condition that have interesting architectural qualities. The main directions of development of former industrial buildings and territories are considered.*

**Keywords:** *renovation, industrial facility, landscaping, integration with the city.*

The modern city is perceived as a single whole, therefore each of its elements influences the overall impression it makes on a person. Abandoned industrial enterprises are also components of this image.

Initially, industrial enterprises were located on the periphery of cities. Over the years, cities gradually expanded, the territories of industrial facilities thus found themselves among residential buildings, differing in their functionality, architectural and artistic appearance and landscaping from industrial zones. Production was moved outside the new city limits - the previous sites were abandoned.



*Figure 1. The territory of the former plant named after A.A. Maslennikov in Samara. Current state. Russia 1].*

Due to the lack of residential and public functions in cities, one of the most pressing issues is the reconstruction of the territories of industrial enterprises that are no longer used for their intended purpose.

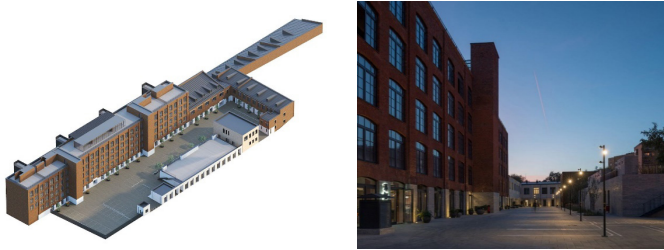
Every city has abandoned industrial zones: territories of former factories, factories, hydroelectric power stations, etc. Often such zones are located in the residential area of the city, occupy expensive land plots, and often have buildings remaining in good condition with interesting architectural features. Therefore, world practice in the matter of further use of abandoned industrial enterprises tends to transform them into new spaces.

Redevelopment is beneficial to both business and the city, as the architectural heritage is preserved and the city budget is saved [20]. Abandoned industrial areas have great potential for development and revitalization. This should have a positive impact on the life of the city and its economy, as well as create new jobs. At industrial facilities

there are features that make them a valuable material and emotional resource for the development of post-industrial cities: free land resources and development, large premises, developed engineering communications, unusual industrial landscape, location in the city, transport accessibility, special compositional structure, high level of local identity, openness experimental practices.

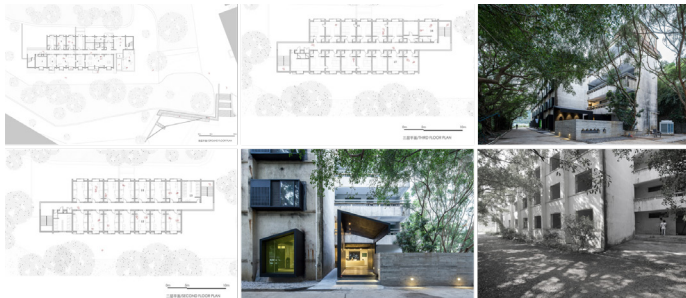
The size, unusualness and isolation of industrial objects from the urban environment mean that they can freely host non-standard forms of leisure or creative practices that, for various reasons, have no place in the city: *extreme sports, noisy public events, contemporary art, artisanal creative production and etc.* Renovation of industrial areas, as elements of urban planning fabric, is possible in several main functional areas:

1) Residential development.



**Figure 2.** Residential complex “Red Arrow” (former warehouse complex), Moscow, Russia [2, 3].

2) Complexes for temporary residence of people.



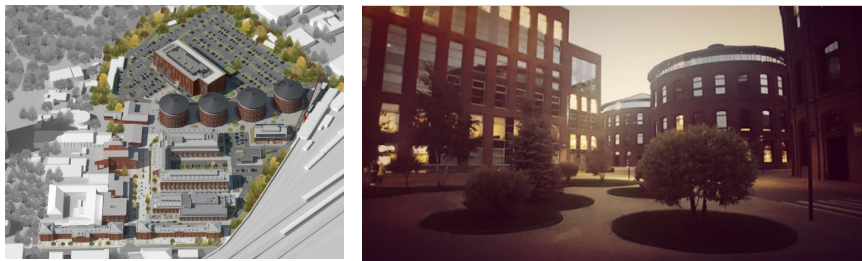
**Figure 3.** iD Town Youth Hotel (formerly Honghua Dying Factory), Shenzhen, China [4].

3) Art clusters [21].



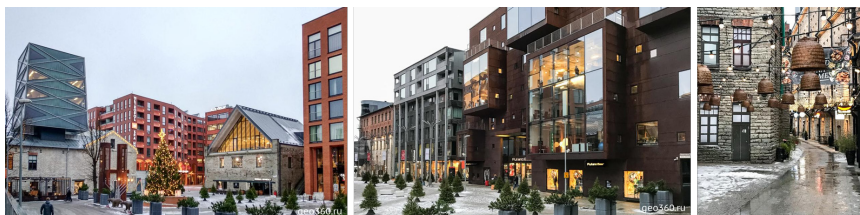
**Rice. 4.** Art center “Bread Factory” (on the territory of the closed bakery factory No. 9), Moscow, Russia [5-10].

*4) Social and business complexes [21].*



**Figure 5.** Business quarter “Arma” (on the territory of the former gas plant “Arma”), Moscow, Russia [11,12].

*5) Retail space.*



**Figure 6.** Rottermann Quarter (on the territory of the former industrial quarter), Tallinn, Estonia [13].

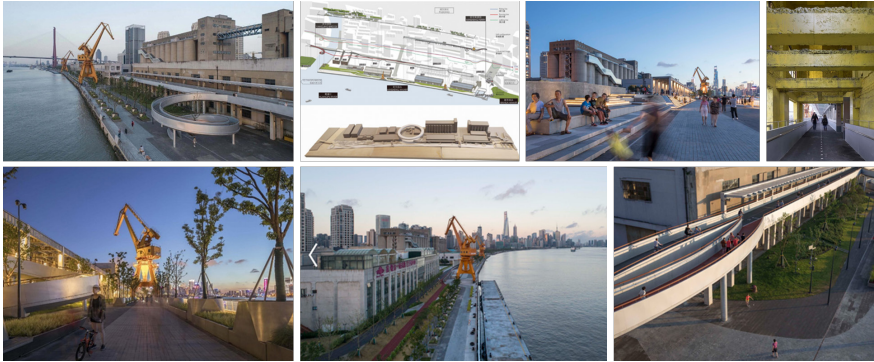
*6) Preservation of the original appearance of the building (museumification) [21].*



**Figure 7.** “Zollverein” Park (on the territory of an inactive coal mine), Essen, Germany [14, 15].

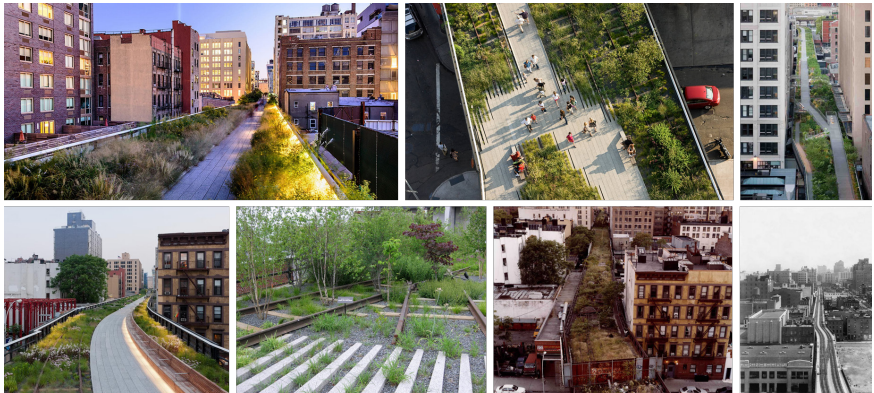


7) *City parks, squares, embankments [21].*



*Figure 8. “Mingsheng” embankment (on the territory of the “Mingsheng” berth complex), Shanghai, China [16-18].*

8) Pedestrian streets.



*Figure 9. Park-overpass “High Line” (built on the site of an abandoned elevated railway), New York, USA [19].*

The main directions for the development of former industrial buildings and territories include three main directions: development of the premises stock, development and improvement of the territory, integration with the city.

**A. The development of the premises stock implies renovation solutions that make it possible to adapt the spaces of former enterprises to new types of use. Such decisions include the following:**

– Construction of mezzanines.

This tool for working with the spaces of former workshops allows you to arrange spaces on two levels or more, which significantly increases the usable area. The installation of mezzanines implies the expansion of the working (for example, office) space.

– Construction of atriums and galleries.

Atriums and galleries solve the problem of creating retail spaces. Auxiliary and service premises that do not require high ceiling heights can be conveniently located under the galleries. Freely located internal open staircases effectively complement the interiors of such spaces.

– Laying streets in large-span workshops and using roofs.

Dismantling the end facades and glazing the roofs makes it possible to organize access of daylight to large-span rooms. This solution allows you to create new public spaces. The possibility of creating separate exits to the roof increases the attractiveness of the premises on the upper floors.

– Ensuring a hybrid environment.

In the context of the development of former industrial sites under a hybrid environment implies the introduction of individual elements into common areas interaction with space, as well as the use of technical and service elements for creative work.

– Organization of multifunctional venues for events, retail spaces, food outlets, coworking spaces.

Venues for public events, retail spaces, food outlets, and co-working spaces are key infrastructure elements necessary to ensure the required intensity of visitor flow.

**B. Development and improvement of the territory implies the following renovation activities: clearing of passages; demolition of buildings and individual structures that clutter the space; organizing convenient access to the premises; arrangement of areas for quiet recreation and sports, as well as areas for street cafes; organizing transport services and organizing parking; organization of lighting of the territory and decorative lighting of facades. In addition to the above, the following techniques are used:**

– Construction of external stairs.

External staircases, existing in industrial facilities and added additionally, can be used to functionally expand the street front area. Such stairs, in addition to providing access to the premises of the upper floors, also provide the possibility of emergency evacuation. The areas between flights of stairs can be arranged as an independent public space, as well as a visual accent for façade solutions.

– Creation of sports parks in industrial landscapes.

Separate mechanisms and production equipment remaining on the territory of an industrial facility, as well as elements of artificial relief, can be used to create

original volumetric-spatial solutions. In particular, such industrial artifacts and landscape elements are of interest for the organization of sports parks, for example for extreme sports.

– Organization of transport services for the territory.

Bright, informative road markings are an effective way to regulate the behavior of drivers in the area. The internal territory of the facility is, first of all, a public space, and it is necessary to ensure that cars do not completely occupy it.

– Organization of information and navigation infrastructure.

A developed information and navigation infrastructure is an integral attribute of modern public spaces. The main elements of such infrastructure include: a map at the entrance, a system of signs in open areas

territory and inside buildings, markings of buildings and entrances, information point nearby main entrance.

**C. Integration with the city includes the arrangement of entrance lobbies, fencing, development of the external perimeter and adjacent spaces. Such decisions include the following:**

– Activation of the external perimeter and adjacent spaces.

The first floors of the outer perimeter usually house functions that enliven the front of the building and are aimed at attracting visitors. With the help of street furniture, seasonal cafe areas, advertising art objects and display of goods on the street, as well as mobile landscaping, the sidewalks of adjacent streets are also activated. Decorative lighting of significant architectural elements (visually dominant buildings, entrances, factory chimneys) creates a memorable evening appearance of the object. Entrances to the territory are located taking into account existing pedestrian routes (including transit routes), ease of access from public transport stops, as well as in places convenient for access by personal car. A system of several entrances (main and several additional) increases the degree of integration of the object into the urban fabric.

– Ensuring visual permeability of the territory.

The visual openness and permeability of the territory of the former industrial site, the ability to see from the street what is happening inside, attracts passers-by and invites them to enter. A tool for such attraction is the replacement of solid fences with transparent ones. In addition, such fences can become another recognizable, memorable element of the updated appearance of an industrial area.

– Providing 24-hour access to the territory.

Former industrial sites must be open 24 hours a day, seven days a week. This will give them the opportunity to become more actively involved in the life of the city. Only vehicle access can be limited; pedestrian entry must be free.

The listed features of development and methods of adapting the territories of former industrial enterprises for modern use have a significant impact on the dis-

closure of new possibilities of territories, the socialization of space, the development of local entrepreneurship, and improving the quality of the urban environment in terms of its functional diversity.

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科学出版物

上合组织国家的科学研究：协同和一体化

国际科学大会的材料

2024 年 4 月 10 日。中国北京

编辑A. A. Siliverstova

校正A. I. 尼古拉耶夫

2024 年 4 月 10 日。中国北京

USL。沸点：98.7。 订单253. 流通500份。

在编辑和出版中心印制

无限出版社



