



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:
July 12

Beijing, China 2023

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 5

2023 年 7 月 12 日。中国北京
July 12, 2023. Beijing, PRC

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

(July 12, 2023. 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。

作者对所引用的出版物，事实，数字，引用，统计数据，专有名称和其他信息的准确性负责

These Conference Proceedings combine materials of the conference – research papers and thesis reports of scientific workers. They examine technical, juridical and sociological aspects of research issues. Some articles deal with theoretical and methodological approaches and principles of research questions of personality professionalization.

Authors are responsible for the accuracy of cited publications, facts, figures, quotations, statistics, proper names and other information.

CONTENTS

ECONOMIC SCIENCES

上合组织与金砖国家的融合：乌托邦还是预期的现实？

Convergence of the SCO and BRICS: utopia or expected reality?

Kharlanov Alexey Sergeevitch, Pavlov Eduard Sergeevich.....9

基于价值的组织管理方法的演变

The evolution of a value-based approach to managing an organization

Berezhnikh Mariya Valeryevna.....17

20世纪末和21世纪我国交通运输体系改革的主要方向

The main directions of reforms in the field of improving the transport system of China at the end of the 20th century and in the 21st century

Kokushkina Irina Vladimirovna, Chaplygina Svetlana Borisovna.....25

财政资源的形成和使用的概念方面

Conceptual aspects of the formation and use of financial resources

Mustafayev Aziz Agasalimovich, Zahariev Radoslav Lyubomirov.....36

加入上合组织后白俄罗斯数字经济发展新机遇

New opportunities for the development of the digital economy in Belarus after joining the SCO

Li Rong, Catherine Gospodarik.....43

JURIDICAL SCIENCES

环境安全领域法律规制不完善

Imperfect legal regulation in the field of environmental safety

Shebzukhova Tat'yana Aleksandrovna, Lysov Nikolai Nikolaevich,

Fursov Vladimir Alekseevich.....53

数字卢布作为民法关系客体的法律资格问题：私人 and 公共法律规制的比例

Problems of legal qualification of the digital ruble as an object of civil law relations: the ratio of the private and public legal regulation

Svarchewsky Konstantin Gennadevich, Sachenko Alexei Leonidovich.....61

关于界定酒精及含酒精产品技术损失概念的必要性

On the need to define the concept of technological loss for alcohol and alcohol-containing products

Chernyakova Elena Evgenievna, Bogatyreva Anna Fedorovna,

Yastrebova Ekaterina Alexandrovna.....66

将无人驾驶民用飞机纳入俄罗斯领空：选定的法律问题

Integration of unmanned civil aircraft into the airspace of the Russian: selected legal issues

Eyrian Gulnur Nikolaevna.....72

“残疾主义”是对残疾人的一种社会歧视形式 «Ableism» as a form of social discrimination against people with disabilities <i>Nosyreva Alyona Evgenievna</i>	78
--	----

PEDAGOGICAL SCIENCES

基于民族导向的方法培养中国和印度尼西亚学生的表达能力 Formation of articulation skills among students from China and Indonesia based on an ethnooriented approach <i>Revenko Inna Vladimirovna</i>	84
高中生英语电子教材内容开发与使用 E-textbook Content Development and Use for High School Students of English <i>Brega Olga Nikolaevna, Kruglyakova Galina Vladimirovna</i>	90
教育数字化背景下学生价值观的文化迁移 Cultural transfer of student values in the context of digitalization of education <i>Sozinova Maria Valeryevna</i>	96
以口语为中心作为初级汉语教学的基本方法 Spoken language centrality as the basic method of teaching Chinese at the elementary level <i>Wang Lin, Almazova Nadezhda Ivanovna</i>	101

PHILOSOPHICAL SCIENCES

中国古代礼仪：社会行为与文化遗产的守护者 Rituals in Ancient China: Guardians of Social Behavior and Cultural Heritage <i>Yakovleva Valeriia Vladimirovna</i>	108
--	-----

PHILOLOGICAL SCIENCES

G. F. 游记中的克里米亚现实 戈贝尔《南帝国草原的复兴》 The realities of Crimea in the travelogue of G.F. Goebel «Reise in die Steppen des südlichen Reichs » <i>Krygin Roman Vyacheslavovich</i>	116
--	-----

SOCIOLOGICAL SCIENCES

利用人为因素管理技术确保不断变化的地缘政治和地缘经济条件下的可持续增长 Use of human factors management technologies to ensure sustainable growth in changing geopolitical and geo-economic conditions <i>Kurochkin Pavel Aleksandrovich, Batumcki Vyacheslav Yurievich</i>	120
---	-----

PSYCHOLOGICAL SCIENCES

现阶段青少年人生成功的特点 Features of the life success of young people at the present stage <i>Mukhanova Irina Fedorovna</i>	133
人类组合能力的功能遗传方面 Functional-genetic aspect of human combinatorial abilities <i>Katkova Elena Nikolaevna</i>	139

HISTORICAL SCIENCES

伟大的丝绸之路作为经济和跨文化互动的表达：历史与现代

Great Silk Road as an expression of economical and intercultural interaction: history and modernity

Kozlova Anna Aleksandrovna, Kozlova Alla Vladimirovna.....147

布里亚特共和国塔尔巴加泰区下日里姆老信徒村的历史（从起源到 1923 年）

The history of the Old Believer village of Nizhny Zhirim, Tarbagatai district of the Republic of Buryatia (from its origin to 1923)

Nikolaeva Larisa Yurievna, Sannikova Marina Iosifovna.....154

CULTUROLOGY

美术作为俄罗斯和中国文化的对话：苏联时期

Fine Arts as a Dialogue of Russian and Chinese Cultures: Soviet Period

Ma Haijun, Tkachenko Elena Vladimirovna.....164

艺术市场的文化创造功能

Culture-creation function of the art market

Shatilov Vadim Vadimovich.....172

ART HISTORY

全媒体时代特色小镇视觉形象塑造策略

Strategies for Shaping the Visual Image of Characteristic Towns in the All-Media Era

Zhu Chuan-Die, Zhang Geng.....177

POLITICAL SCIENCE

功率动力学分析模型

The analytical model of power dynamics

Carkovs Olegs.....182

BIOLOGICAL SCIENCES

俄罗斯分离的假结核菌株的种内遗传分化

Intraspecific genetic differentiation of pseudotuberculosis strains isolated in Russia

Meloyan Misak Gevorgovich, Vodopyanov Aleksei Sergeevich, Trukhachev Aleksei Leonidovich.....191

土拉弗朗西斯菌菌株系统发育分析的综合方法

An integrated approach for phylogenetic analysis of Francisella tularensis strains

Sorokin Vladimir Mikhailovich, Pavlovich Natalia Vladimirovna, Tsimbalistova Marina Viktorovna.....196

弗朗西斯菌属代表噬菌体的诱导

Induction of bacteriophages in representatives of the genus Francisella

Tsimbalistova Marina Viktorovna, Meloyan Misak Gevorgovich, Pavlovich Natalia Vladimirovna.....204

肺炎克雷伯菌在肺炎病原体的病原学结构中的作用日益增强
The increasing role of *Klebsiella pneumoniae* in the etiological structure of pathogens of pneumonia

Anisimova Anastasia Sergeevna, Tsimbalistova Marina Viktorovna, Pavlovich Natalia Vladimirovna.....210

弗朗西斯菌属细菌的囊泡形成过程研究

Study of the vesiculation process in bacteria of the genus *Francisella*

Aronova Nadezhda Valentinovna, Meloyan Misak Gevorgovich, Pavlovich Natalia Vladimirovna.....217

人为影响对积雪理化指标的影响研究

Study on the impact of anthropogenic effects on the physical-chemical indicators of snow cover

Goodeeva Maria Eduardovna, Sirazieva Diana Evgenevna, Abramova Sofya Michailovna.....225

TECHNICAL SCIENCES

基于生产环境质量与环境管理方案实施的安全强化实践（以办公机构为例）

Safety enhancement practices on the base of implementation of quality and environmental management programs for the production environment (on the example of office organizations)

Agoshkov Alexander Ivanovich, Sushkova Anna Vladimirovna, Kurochkin Pavel Aleksandrovich.....230

优化工业安全体系

Optimization of the industrial safety system

Bazhanova Ekaterina Sergeevna, Sorokina Liudmila Vladimirovna.....246

几种俄罗斯粘土的粘合能力研究

A study of binding capacity for several Russian clays

Kotov Artem Nikolaevich, Vartanyan Maria Aleksandrovna, Belyakov Aleksei Vasilevich.....252

CHEMICAL SCIENCES

非平衡热力学框架内的化学过程

Chemical processes within the framework of non-equilibrium thermodynamics

Dubrovin Viktor Vasilevich.....260

DOI 10.34660/INF.2023.62.66.084

上合组织与金砖国家的融合：乌托邦还是预期的现实？
**CONVERGENCE OF THE SCO AND BRICS: UTOPIA OR
EXPECTED REALITY?**

Kharlanov Alexey Sergeevitch

*Doctor of Economic Sciences, Candidate of Technical Sciences,
Full Professor
Diplomatic Academy of the Ministry of Foreign Affairs of Russia,
Moscow*

Pavlov Eduard Sergeevich

*Master's degree student
Diplomatic Academy of the Ministry of Foreign Affairs of Russia,
Moscow*

抽象的。作者考虑了上海倡议和金砖国家“商业俱乐部”框架内的相互合作和替代整合方式，试图使世界不仅多极化和多中心，而且还描述了解决问题的可能途径。新出现的问题，特别是通过私营军事公司和统一的地缘政治分区政策。

关键词：上合组织、金砖国家、私营军事公司、俄罗斯、中国、美国、以色列、地缘政治、人工智能、大数据、神经算法、脱钩。

Abstract. *The authors consider the ways of mutual work and alternative integration of sites within the framework of the Shanghai Initiative and the “business club” of the BRICS, which are trying to make the world not only multipolar and polycentric, but also describe possible ways to solve emerging problems, in particular through PMCs and a unified policy of geopolitical zoning.*

Keywords: *SCO, BRICS, PMCs, Russia, China, USA, Israel, geopolitics, AI, Big Data, neuroalgorithms, decoupling.*

The expansion of the SCO to the state of Iran has shown the vitality and historical attractiveness of the Shanghai Initiative, which has been shaping the minds of Anglo-Saxon world hegemony antagonists for almost 30 years. Moreover, the flow of countries and those wishing to become closer to China and other countries of the axis of complementary, although not always coinciding interests, will find its own solution for India, and for the Asia-Pacific countries, and for the Middle East with African states [1].

The very unification of the BRICS and its internal consolidation under the leadership of N. Modi took place and became possible after the victory of Lula da Silva in the elections in Brazil, which even more brought the positions of global integration platforms at the mega-level and forces the participants of both groups to prescribe their vision on the unity of currencies and settlements in them, to clearly form and separate the planned business approaches and mechanisms for solving tasks agreed upon by all through the development of new transport corridors and hubs, the inclusion of each participant in the process personally in a single infrastructure for digitalization of key and critical nodes of the joint project site and cross-border supplies, new production and flow investments that are able to clearly and gradually resolve the tasks of their personal interests while developing the sovereignty of each state individually, and in cooperation with coalition partners and like-minded people in the fight against the system of colonialism [2].

At the same time, the ideas of global management of all significant actors of the world within the framework of the planetary conservation agenda and the distribution of food resources are preserved, as the foundations of the national security of each of the participants, full and supported by all access to drinking water and to the sufficiency of hydrocarbons that support the GDP growth rates of the Commonwealth states and denying the very exclusivity of the “green agenda”, imposed by the lack of alternatives to the countries of the “golden billion” [3].

At the same time, the role of PMCs is growing as a “soft” and “smart” power, sharing the interests of corporatocracy management with non-governmental actors, without leading to regional and intercountry conflicts, which are always possible with the scale of the grandiose goals achieved and the battle for the unity of the component bases and resources of Industry 4.0 . [4]

According to modern estimates, if in the early 1990s. there was only one “private trader” per 50 military personnel, now this ratio is 10:1 and tends to further decrease. Now there are several hundred private military and security companies operating in Afghanistan and Iraq alone, employing more than 265,000 private contractors. At the same time, in Ukraine, their number has long reached a thousand, thanks to which European PMC mercenaries from former NATO officers and soldiers are already being drawn into the planned redistribution, who receive double salaries for preparing the infrastructure of the Independent for the division of world TNCs through the mediation of “Black Rock” and smaller military-private organizations. And this despite the fact that Ukraine is never accepted into NATO, but J.P. Morgan shares with PMCs all the lands of the Zhovto-Plakytian neo-Nazis, while moving away their membership in both the EU and the North Atlantic Alliance, and exposing the foundations of Slavic culture and artifacts of the relics of saints, stored for centuries in the Kiev-Pechersk Lavra, migrating to the museums of the “golden billion,” as was previously done with Baghdad and Cairo.

To solve the problem of attracting the necessary civilian specialists, both on a permanent and temporary basis, special personnel departments have been created in the US intelligence agencies, which determine the needs in accordance with emerging needs, ensure the search for the necessary candidates, estimate the volume of required financial resources, etc. Most of them were mobilized in 2023, in the form of reservists and instructors, because the Pentagon announced preparations for the Third World War, which must inevitably begin either with Russia for Ukraine or with China for is. Taiwan. [5]

The importance of PMCs in the plans of the US military leadership is also evidenced by the fact that high-quality training of employees of private military companies is provided at the training centers (TCs) of the US Armed Forces. Among the centers where PMC personnel are trained are training centers in San Diego, Mount Carroll, Moyok, etc., where training programs for PMCs have been developed and are operating to study weapons and tactics, master the skills of combat use of weapons (alone, in as part of strike groups, at night, to destroy ambushes, etc.).

Next, we will briefly consider the experience of attracting PMCs to provide military services in France. In the 1990s in France, the only metropolis that retained a military presence in Africa, a reduction in the number of armed forces began, which predetermined the need to assign a number of tasks to civilian structures. French PMCs were created for short periods of time for well-defined tasks, they were led by former officers of the task force of the National Gendarmerie Corps and retired intelligence officials. So, PMC employees in 1992 trained the personal guards of the President of Cameroon for three months, Service & Security in 1995 prepared units to fight the rebels in Togo, Eric SA intercepted the contract for the protection of oil pipelines in Algeria from the British PMC DSL. [6]

The structures used under the guise of PMCs and detective agencies, from the point of view of the Anglo-Saxons, have long triggered questions of the ideology of hegemonism and the selective application of “double standards”, protecting not only their owners, but simplifying, when peacefully, and when in an aggressive version, post-COVID mergers and acquisitions. coming against the backdrop of a growing global recession and an accelerating collapse of the cryptocurrency industry of fintech services for creative calculations of the digitalized future.

The “smart power” and “soft power” structures themselves implement the concepts of polarized permissiveness of “masters” over “slaves”, “masters” over colonies, which for centuries have made metropolises fabulously rich and careless in relation to the lost moral “burden of the white man”.

Analyzing sources about international projects of PMCs, in particular, in the People’s Republic of China, it should be noted that, in accordance with the Law on Weapons, the activities of private military companies in China are prohibited

and supervised by special services from the CPC Central Committee. At the same time, many private security companies are involved in the tasks of ensuring the protection of infrastructure facilities in the Middle Kingdom, the safe implementation of transportation, securitization of the presence of employees of Chinese TNCs and government agencies on the territory of other states, characterized by an unstable domestic political situation and a difficult crime situation. This process is only intensifying, because it directly correlates with the plans for the accelerated reform of the PLA (People's Liberation Army of China), which should be the most combat-ready army in the world by 2027, instead of the milestone of 2028 prescribed at the 20th Congress of the CPC. [7]

At the same time, Chinese PMCs, without advertising and not advertising their activities for political reasons and due to the lack of an appropriate legal framework, and sometimes together with triads, also take part in the provision of military services while ensuring the security of projects implemented by Chinese enterprises in a number of countries of Africa and Latin America, monitor the effectiveness of their foreign investments and suppress any attempts at independence on the part of regulators who are not ready to fully accept the methods and tasks of the Chinese authorities at home.

Thus, the private security company Shandong Huawei Security Group recruits and trains former military personnel of the Armed Forces and the Ministry of Public Security, employees of special units with experience in "hot spots", and aircraft security specialists, the so-called "marshals" and agents of latent escort of special flights and special cargo. Currently, the company provides protection for the facilities of the Chinese oil industry in Iraq, Afghanistan, South Sudan, Angola and the Central African Republic, solves problems in some Asia-Pacific countries and contributes to the growth of China's military island infrastructure in the Indian and Pacific oceans..

Analogous actors of such activities of PMCs in the Middle East and Africa have become classic Israeli PMCs can be divided into three groups: 1) companies operating in Israel; 2) companies operating outside the country; 3) companies registered in other countries for various reasons in order to facilitate access to customers. [8]

In today's Israel, where the threat of terrorist attacks is a daily reality, government agencies are physically unable to ensure the security of every school, mall or hospital, concentrating efforts on strategic and government facilities. The remaining facilities are run by PMCs, the largest of which are Modiin Ezrahi and Amishav, created by former Mossad and Shin Bet employees.

The process of introduction of private military companies into zones of permanent conflicts and zones of growing geopolitical instability that has begun in the world was also reflected in the program plans for the development of Israel's own

state. Thus, the IDF transferred some checkpoints in Judea and Samaria under the responsibility of private professionals and security guards, who, on the principles of outsourcing, implement perimeter security and check the loyalty of strangers near protected objects. The purpose of this process was an attempt to reduce friction between soldiers and civilians at the checkpoints through which tens of thousands of Palestinians enter Israel to work, and this volatility is growing due to developments in deindustrialized, according to the Marshall Plan, Europe, and the beginning of the presidential race in United States, looking forward to 2024. [9]

In addition to guarding the checkpoint, employees of private companies ensure the security of the joint Israeli-Palestinian industrial-innovative and industrial zones. Usually, the army keeps order in the territory surrounding the industrial zone, while civilian security officers guard the perimeter and scan the interior.

It is PMCs that are being used more and more actively by the West in expanding its influence in the post-Soviet space, they are cells of intelligence analytical networks for collecting information, preparing “color revolutions” and civil disobedience actions. In the second half of the 1990s. PMCs actively carried out activities in Chechnya and Georgia. PMCs were also involved in the training of the Armed Forces of Kyrgyzstan. Now, British PMCs have also come as “consultants” to Tashkent in order to ensure the legitimacy of the presidential elections held in early July 2023 for Uzbek voters.

In Chechnya and Georgia, the British-American PMC HALO TRUST (Hazardous Areas Life Support Organization Trust), during the two Chechen conflicts, in the CTO mode, worked on training professional saboteurs-bombers from among the militants, was engaged in intelligence and the creation of a network of local informants, as well as topographic and geodetic survey of the theater of war (theater of military operations), bookmarks on the spot and the organization of caches of weapons and means of communication, which was later discovered and destroyed by the patriotic Kadyrov family and the Chechen people who came to power. In Georgia, unfortunately, such work was not carried out and it became part of the American program to create centers for biological weapons and pharmacological and chemical developments in the field of medicine, almost completely falling into dependence on NATO and on the GRUMO and the CIA.

The geographical structure of the PMC market is usually distinguished by its heterogeneity, fragmentation and latent parts of the implicit inclusiveness of various cells in the matrix of the parent company. The data of the Association for International Peace Operations in 2021 indicate the following placement of the largest PMCs: 55% in the United States, 27% in the EU countries (mostly in the UK), 9% each in the Middle East and Africa. Most of the “work” they do in Iraq, Afghanistan, Jordan, Kuwait, the United Arab Emirates and Colombia. [10]

The US and UK governments are the largest customers of the military outsourcing industry in the world. Further, among the main customers of private

military services are private companies, mainly TNCs, followed by individuals, VIPs, and in last place are international intergovernmental organizations. Thus, one of the customers of private military and security services is the UN itself. For example, the logistic support of the UN mission in Darfur is carried out by the American PMC. The British PMC Aegis, under contract with the UN mission in Iraq, provided security for the staff of the UN department during the elections.

In the structure of private military companies by type of activity, the largest part is occupied by military consulting companies that carry out strategic planning, reform of the armed forces, training of army units, retraining of officers and technical personnel, as well as military logistics companies engaged in logistic support for troops and the construction of military facilities on the territory of other countries. countries.

There are also private security companies on the market, or security companies engaged in consulting in the field of crisis management, risk assessment, security consulting, protection of facilities, provision of bodyguards, demining, training of army and police units. [eleven]

In connection with the development of piracy in the Gulf of Aden, a new line of activity has appeared for PMCs - escorting ships, negotiating the transfer of ransoms and captured ships and crews. The astounding helplessness of the US and EU fleets off the coast of Somalia prompted private military companies to create their own armed fleets, and Russia continued its patrols of these waters from Tartus, from its naval base in Syria.

There is experience in attracting employees of private companies to solve certain problems in emergency situations of a natural and man-made nature. So in 2005, a number of companies were hired to clean up the aftermath of Hurricane Katrina. About 200 PMC employees were sent to the regions affected by the hurricane, 160 of them provided protection for state facilities. The same precautions and protection of the industrially significant perimeter were taken by British Petroleum after a man-made oil spill near the coast of Venezuela, which turned into an environmental disaster in the central Atlantic.

An important feature of PMCs is that, being, in fact, ordinary commercial companies, they can hide the nuances of their specific activities under the pretext of protecting trade secrets, protect state secrets entrusted to them, under the guise of formalizing security, logistics and monitoring, collect and through neuroalgorithms AI and Big Data provide predictive scenarios for the actions of their owners in the region, with minimal costs and the most effective precautions. [12]

Of increased interest is the emergence of new forms of outsourcing. One example is a contract to ensure a given level of functional characteristics of systems W and ME, according to which the manufacturer, on a long-term basis (as a rule, at least 3-5 years) and at a fixed contract price, undertakes to ensure the required

degree of combat readiness and combat capability of the system and performance characteristics. The same agreement welcomes further upgrades, replacement of components and spare parts with more demanded modernization or local placement of repair or modernization cross-border production chains. [13]

The process of planning the use of contractors involves taking into account many factors, is characterized by the complexity of coordination, requires the coordination of efforts and the organization of interaction between many different bodies and authorities, while regular logistic units are most effectively integrated into the combat management system and are associated with the success of logistical deliveries in the form of feedback on ongoing hostilities. [14]

Therefore, both the BRICS and the SCO, while solving the tasks of maintaining the unity of interests, support and share their areas of responsibility and find compromises on interaction at the level of TNCs and TNBs, on behalf of the states of these integration zones and the “business club”, BRICS, draw the geography of a new contour of the world order based on international law and on mutual respect for the interests of a single set and the vector of development for each participant personally. The world is emerging from the hibernation of the covid recession and bubbles of market volatility into dividing the world economy into military-currency unions and ICT delegation platforms, like AUKUS and KUAD, giving an advantage to those who were able to distance themselves from the chaos of hegemonism in time and move into alliances of common standards for the way of doing business. activities and development of new types of weapons, against the colonial milking of their historical satellites by the metropolises, which do not allow hearing the true aspirations of ethnic groups and living by the momentary interests of neocon elites. [15]

References

1. *Ocean Solutions, Forest and land forecast development*. - URL: <https://www.oceanpanel.org/ocean-action/files/executive-summary-ocean-solutions-report-rus.pdf> (date of access: 06/13/2023).
2. *Tibetan “unicorns”*: how they reshaped the Chinese startup market. 06/13/2023. *Economist. Venture industry and startups*.
3. *Hungry “tigers”*: how China and the US are dragging Asian economies to the bottom. *Economist*. 12/16/2022. *Economic trends*.
4. Herman Simon. “*Hidden Champions*” Publisher. 2009. P. 23-26; 45-48.
5. Kharlanov A.S., Khairtdinov A.K., Boboshko A.A. *Creation of a new civilizational way of planet Earth: transition to a “green economy”*. *Features and risks. Innovation and investment*. 2021. No. 10. pp. 18-23.

6. *Expert No. 35 (1264). Evgeny Ogorodnikov we win on their field and according to their rules* - URL: <https://www.expert.ru> (date of access: 05/09/2023)

7. *Kotler, Philip. Marketing 5.0. Next Generation Technologies/Philip Kotler, Setiawan Ivan, Kartjaya Hermawan;* - Moscow: Eksmo, 2023.-244-246 p.- (Marketing Atlantes).

8. *China is a strategic partner and valuable neighbor. Civilization choice and modern trends of cooperation: monograph\ A.S. Harlanov, I.A. Maksimtsev, A.A. Boboshko, M.M. Novikov; resp. ed. S.V. Loktionov.-* Moscow: 2022.- 176 p.

9. *Space of Russia: the choice of the future and the main trends of dominance: monograph / A.S. Harlanov, M.M. Kharlamov, R.V. Bely, A.A. Boboshko, M.M. Novikov; scientific ed. V.I. Kryuchkov.-* Moscow: 2022/-208-212 p.

10. *Mark Griven, George Yip, Wei Wei. Innovators of the Middle Kingdom or Chinese business conquers the world. M. 2022. Lanit. pp.45-48.*

11. *Kai-fu Lee. The superpowers of artificial intelligence. China, Silicon Valley and the New World Order. Boston. NY. 2018. Houghton Mifflin Harcourt.*

12. *Martin Ford. The power of robots. How to prepare for the inevitable? M. Publishing house "Alpina". 2022. P.82-86.*

13. *Kharlanov A.S. Propaganda and "soft power" of "digital nomads" in the era of NWO. Higher school: scientific research. M. 2023. P.98-103.*

14. *E. Holthaus. Earth of the future. M. Publishing house "Portal 21". 2021. P. 23-27.*

15. *Klaus Schwab. Technologies of the Fourth Industrial Revolution. M. Publishing house "Bomora". 2022, pp. 68-74; 134-136.*

DOI 10.34660/INF.2023.82.10.085

基于价值的组织管理方法的演变
**THE EVOLUTION OF A VALUE-BASED APPROACH TO
MANAGING AN ORGANIZATION**

Berezhnikh Mariya Valeryevna

*Candidate of Economic Sciences, Head of Department
Irkutsk National Research Technical University*

抽象的。本文论述了价值导向管理的本质和内容。显示了以价值为导向的管理方法的演变。概述了开发以价值为导向的组织管理方法的问题。

关键词：价值管理、价值导向的管理方法、组织的原则和价值观、企业文化、战略发展。

Abstract. *The article deals with the essence and content of value-oriented management. The evolution of the value-oriented approach to management is shown. The problems of developing a value-oriented approach to managing an organization are outlined.*

Keywords: *value management, value-oriented approach to management, principles and values of the organization, corporate culture, strategic development.*

At the end of the 20th century, a values-based approach to company management arose, which became the answer to the question of the relationship between the goals of the organization and social goals. Value management is the most relevant tool for integrating a company into the global social agenda. Solving this complex and multifaceted problem requires companies to actively search for the optimal combination of classical methods and new management models.

The modern world requires more from companies than the old approaches based only on financial indicators. It is important to be managed in a way that creates value not only for owners, but for society as a whole. In this new approach to company management, companies must operate not only with cost indicators, but also with the values of society. Any company must include the issue of creating social value in its strategic planning to keep abreast of the demands of the times.

The concept of a value-oriented approach originated at the end of the 20th century, at a time when the opposition between society and corporate structures seemed insoluble in the realities of the former economic model. The approach to business as a subject created to increase the value of its owners [3] was expanded

[4] and it was proposed to consider other groups of stakeholders as recipients of values in addition to owners. The theory of stakeholders in the key of corporate social responsibility [5] helped to focus on the effects of companies on various stakeholders. In the work *Valuation: Measuring and Managing the Value of Companies*, authored by a group of authors from McKinsey & Company, Tim Koller, Marc Goedhart, David Wessels in 1990, the approaches of the then emerging idea of value-based management were integrated and structured [6].

As part of value-based management, a new economic metric was involved - value as an indicator of the company's success. When making a decision, the manager must have information to evaluate and distinguish value from alternative strategies and have sufficient motivation to choose a value-adding strategy. Value-based management is built on the continuous definition of indicators that can reflect the increase in the value of the company. Canonical criteria, such as net profit and its growth, are not always suitable for such an assignment. It is necessary to define non-financial goals, for example, the level of customer satisfaction, product innovations, saturation of human resources, etc. However, directly influencing value is problematic, so the basis of value-based management is a deep understanding of the variables that can create business value, i.e. key value drivers. Different levels of management have their own indicators of value, which in essence represent a breakdown of goals into components. This breakdown creates controllable metrics for line managers that can be measured and improved on a regular basis. The improvement of these indicators, in turn, increases the value of the company and has an impact on the goals of the highest level.

The value approach combined the global goals of the organization with the goals of line managers who carry out certain operations every day. The approach has helped enterprises work more effectively on the implementation of global strategies and control the implementation of large tasks at various levels, focusing on key value indicators. This approach made it possible to expand the view of the company and introduce the implementation of the mission of the organization, but the value of business from the point of view of the state, society, indirectly affected by the social. groups were not included in this model. The considered approach has expanded with the emergence of the stakeholder approach in management.

The emergence of the concept of stakeholders in scientific circulation and corporate practice [4; 7] helped to concretize the company's performance indicators.

Various indicators can be used to measure stakeholder satisfaction, such as the level of support of the local community, the image of the company as a fair player, and the willingness of customers to protect the company's products. Representatives of the stakeholder approach are confident that improving the company's reputation in the field of relations with personnel, suppliers and customers can have a positive impact on its financial performance. Such a positive impact can be

the result of motivating employees to perform better, improve the quality of the production chain and increase sales.

At the beginning of the 21st century, the problems of the connection and difference between the value-oriented and stakeholder approaches were widely discussed. One reflects the importance of creating value for owners, the second reflects the importance of creating value for a wide range of stakeholders.

Wallace writes in his article [7] that long-term value creation by a company necessarily leads to investment in building trust relationships with stakeholders. The author confirms this with research that organizations that generate more value for their shareholders and owners in the long term look better in terms of satisfying the interests of stakeholders. Wallace understands attachments and brings a bit of difficulty into the mix, as research is ambiguous about the relationship between high returns for company owners and high levels of reputation with stakeholders. It should be considered as both paths that affect each other. This means that companies must create value for owners in order to satisfy their stakeholders. On the other hand, creating additional value for owners is possible with improved work with stakeholders.

The stakeholder approach can be characterized by the following words: creating social value by increasing the company's revenues. This is how the possibility of integrating the stakeholder method into value-oriented management appeared. Such a combination allows companies to more consciously set long-term goals in conjunction with the business environment and will help improve their own financial performance and reputation.

The emergence of the concept of sustainable development has led to the evolution of the concept of value management in the development models of companies. Sustainable development means development that does not impair the ability of future generations to meet their needs, while meeting the needs of current generations is harmless [8]. The main goal of sustainable development is to create long-term social value and build a responsible society that cares about future generations. Companies are increasingly appreciating the importance of voluntary corporate social reporting in the context of this area. The emphasis in evaluating the role of social activity as a source of corporate value shifts when the inclusion of corporate social responsibility becomes an essential element of a company's development strategy. [10; 9].

However, for some managers, this approach seemed to be nothing more than a moral code; many generally faced sustainable development only as restrictive measures and additional measures. expenses. Only a small part was able to use the concept as a business opportunity to achieve goals through innovation [11]. The authors of the article (Hart, Milstein, 2003) on creating value through the implementation of sustainable development argue [12] that global challenges in

conjunction with specific business goals will increase the value of the company for owners. This statement is very close in spirit to the stakeholder approach. Not surprisingly, these approaches developed at about the same time.

The 4 main lines of business that fit into the ideology of sustainable development consist of the following key areas: first, firms can reduce the use of resources and reduce environmental pollution, including by increasing the level of value; the second is to increase transparency and involve civil society; third - the possibility of creating new technologies and methods of production aimed at reducing the negative impact of man on the planet; fourth, the creation of value will include providing for the needs of the poorest part of the population and creating a system of equal distribution of wealth.

The approach proposed by the authors made it possible to combine the concepts of “value” and “sustainable development”, thus transferring the tasks of the organization from the local level to the global level. The use of global concepts of sustainable development in the strategic management of companies has proven its effectiveness in large companies, which has been confirmed by a number of scientific papers [13; 14]. The ideas of sustainable development were formalized in the section of corporate social responsibility. This section has become mainstream in developed countries and is becoming increasingly popular among Russian companies. The Corporate Social Responsibility Report is an international standard for reporting and is indicative for large organizations, as it can sometimes become a “pass” to markets and associations. Value creation and management must be considered at work, as sustainability has become an integral part of this approach.

From the considered concepts, the so-called Triple bottom line Concept was formed [15] - the concept of building a business, according to which entrepreneurs and managers should take into account not only financial performance, but also social and environmental performance of the organization. According to the concept, business is built on the “three pillars of sustainable development” - the planet, people and profit. Strategic planning sets goals in three key areas: goals for maximizing value for owners and shareholders, goals for harmonizing the interests of stakeholders, and goals for social and environmental responsibility.

Summarizing, we note that the concept of “values” is the basis of the modern understanding of the strategic management of an organization. A modern company must be sustainable and strive to solve social and environmental problems in order to create long-term competitiveness. In the modern sense, the main components of value are the creation of value for stakeholders, the embodiment of the company’s mission through the decomposition of strategic goals and adherence to global principles of sustainable development. Companies can build a value management system and control its creation through the use of methodological tools that are available in each of the described approaches.

Value-based management can have a number of problems in practice. First, values may not always be clearly defined and may also change over time, making them difficult to apply in practice. In addition, values can become an obstacle to achieving company goals. For example, focusing on ethical and social values can create challenges in balancing profits and growth, which are also important components of a company's success.

In addition, not all values can always be achieved at the same time. Some values have to be prioritized over others, so management can become conflicted. If management cannot agree on which values to prioritize, the situation can become problematic.

If we talk about the competitive environment, then a value-based approach may not be effective. In this situation, companies are forced to neglect their values in order to quickly respond to changes in the external environment. Quick decisions and reactions to changes in the market become critical.

The corporate governance system cannot be considered separately from other factors that determine market relations in a particular country. These factors include the values characteristic of a given society, the economic model, the level of mutual trust between business, the state and the population, the legislative framework, the application of the law in practice, conflict resolution methods, and the transparency of corporate information [1].

Initially, the institution of corporate governance was created to improve the welfare of the company's shareholders. Value-Based Corporate Governance (VBCG), that is, value-based corporate governance, is the main mechanism, which is mainly determined by the economic direction [2]. It is a formal and systematic approach to managing an organization that aims to make the best use of the economic mechanisms of cost management to maximize long-term value for the owners. In the VBCG process, certain processes support the organization in achieving the highest possible value by focusing on key value drivers in management decision making. VBCG is a management technique that can be used for a variety of tasks, not just limited to economic aspects. These tasks may include, for example, corporate strategic choice, resource allocation, implementation of controls, goal setting and results analysis, organizational culture development, organizational structure analysis, investor relations management, and information transparency. An important aspect is the creation and maintenance of trusting relationships with business participants to ensure balanced interests.

In the beginning, value-based corporate governance focused on the concepts of "worth" and "value", putting economic management at the forefront. However, the INSEAD study, which examined 117 large corporations that had adopted VBCG in North America, Europe, and Asia, found results to be out of line with the targets associated with an emphasis on economic management. The main reason

for failure is often the one-sided implementation of this approach without a corresponding transformation of the corporate culture. Many organizations have used VBCG to measure economic profit to evaluate the performance of their employees and have tied monetary rewards to certain parameters that have been agreed upon in the performance evaluation.

The development and implementation of a value-based corporate governance mechanism is crucial for unlocking the market potential of an organization and taking into account the social factors of companies. One of the most effective tools for such governance is corporate governance based on values (CGBV).

Corporate governance based on values (Corporate Governance by Values) helps to ensure [12]: growth in the efficiency of the company, including labor productivity, efficient use of working time and many other resources; increasing the satisfaction of employees of the organization with the conditions and results of their work; the ability to control at the macro level, i.e. management of the organization as a single organism with the help of norms and rules based on values; establishing the optimal level of cohesion of employees; formation and development of trusting relationships between internal and external stakeholders of the organization.

In today's reality, one of the ways to achieve your goals is corporate governance, which is based on values. A specific value system, created and maintained within the company, is necessary for the successful achievement of the set goals. Value-based corporate governance is a combination of different elements (the company and the values of internal and external stakeholders) that are directed towards a common goal (development of mutually beneficial and trusting relationships).

However, if the corporate governance system does not take into account the values of stakeholders, then its effectiveness is questionable. A key task of a value-based corporate governance system is to analyze the values of all parties and create priorities based on their relationship with the organization.

Thus, the most important component of value corporate management is the definition of important strategic goals and priorities, following which will give the result necessary for all stakeholders.

However, world and domestic practice proves that most companies still consider profit to be the main priority, and this is, firstly, due to the great desire of owners and managers to "squeeze out" as much profit as possible in the shortest possible time, i.e. most of the profit is needed momentarily and, secondly, the reluctance to reinvest in the company to ensure its sustainable development, there is no long-term focus in organizations, because of the fear of losing the company as a result of unforeseen changes and risks.

Also, a number of problems related to the introduction of a value-oriented approach to the management of an organization should be considered. The first

problem is that a significant part of managers do not attach sufficient importance to business ethics and values focused on the public good [1]. Instead, many managers tend to pursue vested interests and strive to maximize profits. This leads to the failure to use the potential of a value-based approach. The second issue is the lack of understanding of the role of values in the management process. Many managers believe that management should be focused only on economic results, and not on social values, which leads to damage to the company in the long run.

The lack of specific techniques for implementing a value-based approach is the third problem that companies face. Despite the fact that there are many concepts and approaches to management in accordance with values, it is very difficult for managers to put them into practice without having a unified normative framework for behavior.

Stimulation and encouragement of managers' orientation to values and socially responsible behavior will help to correct the situation. In the long term, the use of a value-based approach will be the key to the company's success. However, to achieve this goal, it is necessary to overcome existing problems and ensure that managers are aware of the role of values in business.

Summing up, we can say that a value-based approach to management is an effective development tool, but it is necessary to take into account its potential difficulties when implementing it in reality. Each company must decide for itself what values are most important to it and how to implement them in specific conditions.

References

1. *Shestopalov R.V. Value Management and Value Education: Theory and Practice // Higher Education Today. — 2011. — No. 9. — P. 105-112.*
2. *Stephanie Bondoni Facebook Scandal 'Game Changer' in Data Privacy Regulation // Bloomberg. — 2017. — URL: <https://www.bloomberg.com/news/articles/2018-04-07/facebook-scandal-a-game-changer-in-data-privacy-regulation>.*
3. *Rappaport A. Creation of shareholder value: a guide for managers and investors // Journal of Accounting. — 1986. — P. 51-58.*
4. *Freeman R.E., David L.R. Shareholders and Stakeholders: A New Look at Corporate Governance // California Management Review. — 1983. — No. 25. — P. 113.*
5. *Carroll A.B. Corporate Social Responsibility Pyramid: Toward Moral Management of Organization Stakeholders // Horizons of Business. — 1991. — No. 4. — P. 39-48.*

6. Bryant J.W., Ackoff R.L. *Redesigning the Future: A Systematic Approach to Social Problems* // *Journal of the Society for Operational Research*. — 1976. — No. 1. — P. 131-132.

7. Wallace J.S. *Value Maximization and Stakeholder Theory: Compatible or Not?* // *Journal of Applied Corporate Finance*. — 2003. — No. 3. — P. 120-127.

8. Kibl B.R. *Brundtland Report: “Our common future”* // *Med. war.* — 1988. — No. 1. — P. 17-25.

9. Kayachev G. et al. *Sustainable Development vs. Post-Industrial Transformation: Opportunities for Russia* // *II International Innovative Mining Symposium (dedicated to the Year of the Environment in the Russian Federation): E3S Web Conference. Kemerovo.* — 2017.

10. Kayachev G.F. *Corporate social responsibility in the strategy of Russian business in the educational environment* // *Trajectories of reforming the Russian economy: Proceedings of the International Economic Symposium dedicated to the 50th anniversary of the TSU Faculty of Economics. Tomsk.* — 2014. — P. 257-261.

11. Holliday S. *Sustainable growth, the DuPont way* // *Harvard Business Review*. — 2001. — P. 70.

12. Hart S.L., Milshstein M.B. *Creation of sustainable value* // *Academy of executive management*. — 2003. — No. 2. — P. 56-67.

13. Jensen J.P. *Creating sustainable value through recycling: three industry examples* // *Journal of cleaner production*. — 2019. — P. 304-314. — doi: 10.1016/j.jclepro.2019.01.301.

14. Piatari S. et al. *Does sustainable development contribute to value creation? Empirical data from the global energy industry* // *Corporate social responsibility and environmental management*. — 2012. — No. 6. — P. 317-326.

15. Slaper T., Hall T. // *Indiana University Kelly School of Business*. — 2011. — P. 4-8. — URL: <http://www.ibrc.indiana.edu/IBR/2011/spring/article2.html>

DOI 10.34660/INF.2023.34.20.086

20世纪末和21世纪中国交通运输体系改革的主要方向
**THE MAIN DIRECTIONS OF REFORMS IN THE FIELD OF
IMPROVING THE TRANSPORT SYSTEM OF CHINA AT THE END
OF THE 20TH CENTURY AND IN THE 21ST CENTURY**

Kokushkina Irina Vladimirovna

*Candidate of Economic Sciences, Associate Professor
Saint Petersburg State University*

Chaplygina Svetlana Borisovna

*Student
Saint Petersburg State University*

抽象的。 中国的发展成果表明，经济改革是客观必要的，并影响到包括交通运输在内的国家生活的各个领域。 各阶段改革方案中都提出了基础设施和交通支持问题。 而且，运输服务是实现国际贸易的最重要因素。 就此而言，中国丝绸之路经济带倡议体现了中国交通运输发展改革的现代思路，即融入全球经济关系体系，拓展与周边国家的交通基础设施建设，推动国际货运航线高质量发展，尤其是铁路货运作为我国国民经济最重要的支柱。

关键词：交通运输系统、基础设施、经济改革、五年计划、中国、丝绸之路经济带、世界经济。

Abstract. *The results of China's development have shown that economic reform is objectively necessary and affects all spheres of the country's life, including transport. In the plan of each stage of reform, the issues of infrastructure and transport support have been raised. Moreover, transport services are the most important factor in the realization of international trade. In this regard, China's Silk Road Economic Belt initiative reflects China's modern approach to transport development reform, namely integration into the system of global economic relations, expansion of transport infrastructure with neighboring countries, promotion of high-quality development of routes within international freight transport, especially rail freight transport as the most important pillar of China's national economy.*

Keywords: *transport system, infrastructure, economic reforms, five-year plan, china, silk road economic belt, world economy.*

The most important characteristics of the transport system of China

The transport system as a set of vehicles, infrastructure and management functioning on the territory of the country is the most important factor in the economic and social development of the country. As Jin Fengjun notes, “A systematic analysis of the processes of formation and evolution of the transport system allows us to understand the direction of its future development and provide a theoretical basis for the development of the country ‘s macroeconomic policy”[7]. Transport implements two opposite functions: on the one hand, it acts as *a stimulating factor of innovative economic development* (based on a combination of increasing productivity with the expansion of the infrastructure network and the creation of new types of rolling stock) and *as a deterrent* (if the productivity of the transport network reaches its limits, it entails a decrease in the efficiency of the transport process (growth the cost of transportation, slowing down the delivery of goods) and incomplete satisfaction of demand) [10].

The transport system is formed as a result of the comparison of competitive advantages and the interaction of all modes of transport in a certain period, and also reflects the characteristics of the demand for transportation. The transition to the development of transport is the process of optimizing the ratio of the distribution of transport resources and transport investments in each mode of transport and region. In a sense, the optimization of the transport system is not only a way, but also the goal of the transition to the development of transport.

The transport system of each country has its own specific features, which are determined by both its geographical characteristics and economic development.

In China, the process of developing the transport system corresponded to the economic needs of the country at different stages and effectively contributed to economic growth and strengthening the unity of the economic space [10]. *This is due to the systematic approach of the Communist Party of China to reform*, which is also inherent in reforms in the field of transport. It involves relying on China’s national strategy, medium- and long-term planning (lasting 10 years), short-term planning (including transport aspects in five-year development plans). Also, *the role of the state as a management component* of the transport system is to reduce costs, improve the business environment (compliance with international standards, definition of the powers of central and local authorities, optimization of administrative management), strengthening the drivers of development [1].

Let’s consider the most significant characteristics of PRC’s transport system. These include the industry, geographic and regional structure of the system, as well as the structure of investment in fixed assets by mode of transport [6].

The industry structure reflects the ratio of transport resources in six types of transport: rail, road, water, air, pipeline and inland river. Rail transport prevails, it is they that transport the majority of priority important goods, such as: coal, which

is the main source of energy in China and, in addition, the largest-tonnage cargo (52.2% of the total share of cargo turnover in 2018), oil, steel and iron (5.7%), metal ores (13%), mineral building materials, cement, wood, chemical fertilizers and pesticides, grain, cotton, salt [26]. Due to the fact that more than 80% of coal in China is mined at mines located in the northern and western parts of the country, far from economically developed industrial centers on the eastern and southern coasts, it is necessary to transport large volumes of coal from the interior of the country to the coast over long distances. This determines *the geographical structure* of freight transportation by rail.

The uniqueness of the territory of China, which largely determines the dominant position of rail transport and the active introduction of high-speed rail transport, lies in the features of the relief (the presence of significant areas of mountainous regions and other difficult areas for transport), the large area of the occupied territory (9.6 million square kilometers), the great distance of large cities from each other, the presence of a large number of large cities (with a population of 4-5 million people), etc [20].

The priority of rail transport is obvious when considering *the structure of investments in fixed assets by type of transport*: much more is invested in the development of railways and related infrastructure in China than in other types of transport. Due to the same factors, the second mode of transport is automobile. More than 50% of all investments in fixed assets by type of transport were directed to the development of these two modes of transport in the period from 2006 to 2018 [26]. At the same time, significant amounts of investment are invested in the construction of expressways, as well as improving the infrastructure of railway transport (reconstruction of old railway roads and construction of modern railway roads).

It is obvious that the development of the transport system requires **technological innovation**, which serves as a way to accelerate the pace of transition by increasing the productivity and capital efficiency of transport at the same cost [5]. Moreover, in the 21st century, China's transport supply and service area is shifting from relying on increased transport investment to relying on technological innovation.

In this way, consideration of China's transportation system as a whole shows the exceptional importance of rail transport for China, which is due to the territorial and economic characteristics of China, as well as the advantages of this type of transport.

Features of reforms in the field of improving freight rail transport in China at the end of the 20th century

As is known, China's economic reforms have passed through several stages in their development. The goals and objectives of the stages are reflected in the goals and objectives of the five-year development plans. Below we will consider in more

detail how the improvement of China's transport system was addressed within the framework of individual five-year plans.

Reforms in rail transport in the 20th century included management reform, diversification of funding sources, and active modernization of the infrastructure component.

Until the late 1970s, China's national development strategy did not pay much attention to the development of the country's transportation system. Moreover, transport was one of the weakest parts of the national economy. *Among the reasons for the economic inefficiency of the transport sector are:*

- *low investment attractiveness*
- *lack of competitive regulation*
- *barriers to entry of private capital*
- *imperfect infrastructure, low quality and shortage of rolling stock and transport equipment, etc* [1].

In addition, there were significant imbalances between investment in the development of China's industrial sector and investment in the development of transport infrastructure. *Sazonov S. L.* sees the reason for the disproportion in the following: "incorrect assessment of the economic efficiency of investments in the development of this industry. An important factor that was not taken into account was the savings achieved in the branches of material production due to more rational development and placement of transport enterprises, as well as reduction of product losses" [9].

The understanding that transport is the most important fundamental system that allows the interaction of economic units involved in social reproduction came by the end of the 1980s. It was from **the 7th Five-Year Plan** (1986-1990) that the emphasis was placed on the development of the transport component. This is the period of solving the problem of lagging development of the transport complex. Investment in the transport sector begins to grow in the total amount of government investment (6.2 billion yuan in 1980, 300.7 billion yuan in 2010) [26].

In this regard, it should be noted that during the reform period, the approach to *the sources of financing* changed significantly: before the reform and opening up policies, transport projects were mainly financed from domestic sources in China. These sources included government allocations, profits of state-owned enterprises and local government levies. The central government was responsible for national road development, while regional governments were responsible for local construction. Under the centrally planned system, regional governments usually received funds for infrastructure construction from the central government. Since the reforms, the sources of funding for roads have increasingly diversified to include not only central and local government funds, but also loans from international organizations and banks, as well as foreign capital. This is what made it possible to improve the technical condition of the roads.

The large-scale solution to the problems of improving China's transport system began with the 7th Five-Year Plan and continued at an increasing pace thereafter. The main thrust of the 7th Five-Year Plan reforms was to expand the rights of individual companies to conduct independent economic activities. It was important to identify and strengthen the points of convergence between the interests of the state and railway enterprises. *Partial decentralization, delegation of powers to regional authorities and broader partnership with the private sector were the main instruments of change.* Decentralization consisted in the introduction of an economic responsibility system under contract between the central government and the Chinese Ministry of Railways (1986).

These measures were due to a number of reasons:

- the lack of funds from the central government as well as in the provinces for the construction of railroads in the provinces, which were essential for regional socio-economic development;
- changing economic environment, including decentralization, in particular the degree of separation of local budgets from the central government, which gave local governments more autonomy to invest;
- growing experience of joint ventures in other sectors of China's economy
- the success of international experience in power sharing between the center and provinces in railroad management [15]

The 8th Five-Year Plan (1991-1995) was the peak of railway transport development. There has been a 240% increase in capital investment compared with the previous Five-Year Plan, amounting to about 108.1 billion yuan [13]. Three thousand km of new railway lines, 3,848 km of second tracks were put into operation, 2,973 km were converted to electric traction [8].

The key object, which was completed in 1995, was the Beijing-Jiulong Mainline (2,381 km, the largest railway in China's history up to that time in terms of the scale of work and the volume of capital investment). Connecting the north and south of the country, this highway crosses seven provinces, several railroads and major waterways, making it the most important link in China's transport system [17].

The central guideline for the development during **the 9th Five-Year Plan** (1996-2000) was the Railway Transportation Development Program for 1998-2002, the main result of which was the transition from unprofitable to profitable railroads. As a result, by the year 2000 the overloading on the railroads became less noticeable, the profitability of China's railroads increased [23].

Key projects: Increasing the speed of trains on the main lines: Beijing - Shanghai, Beijing - Guangzhou and Beijing - Harbin. The average speed was increased from 70-80 to over 90 km/hour, and in some sections up to 140 km/hour. As for freight transportation, the number of freight trains slightly decreased, but the number of heavy trains increased [14].

In 1999-2002 the country's first high-speed railroad Qinhuangdao - Shenyang (405 km, 200 km/hour) was built, it runs parallel to the main line overloaded with freight trains [2].

The measures taken within the framework of transport reforms in the 20th century laid a solid foundation for further deepening of reforms and allowed defining development targets.

Features of reforms in the field of improving freight rail transport in China at the end of the 21th century

The need for reforms in the railroad sector, in parallel with the tasks of ensuring the growth of other components of the economy, poses new challenges for China in the 21st century.

Table 1 shows the key drafts of the five-year plans for rail transport development.

Table 1
Key projects in the field of railway transport infrastructure improvement, 2001-2020

Stage and duration	Key projects
The 10th Five-Year Plan (2001-2005)	<ul style="list-style-type: none"> - completion of the construction of the second section (Golmud — Lhasa, 1142 km) - the highest and longest highland railway in the world – the Qinghai-Tibet Railway. According to experts of the Ministry of Railways of China, this project has reduced the cost of cargo transportation by 50%. - commissioning of the Xi'an-Hefei section (1,196 km, 23.23 billion yuan, halving travel time to 1.5 hours) of the Nanjing-Xi'an railway. - completion of the electrified Chongqing-Huaihua single-track railway (640 km, 18.23 billion yuan, halving travel time to 8 hours)
The 11th Five-Year Plan (2006-2010)	<ul style="list-style-type: none"> - The construction of the Jinhe–Kuldzha–Korgas railway was completed by the end of 2007. In Xinjiang, the construction of railways on the routes «Kashi – Khotan», «Kashi – Kyrgyzstan» and «Kashi –Uzbekistan». - Since July 2008, the construction of a 488-kilometer railway line to Khotan. On the Central Asian section, it is planned to link China with Kyrgyzstan and Uzbekistan. Among other things, the project is designed for the development of three districts of Southern Xinjiang. - On July 1, 2006, the highest Tibetan railway in the world, Sinin-Lhasa, was opened, with a length of 1956 km (the speed of trains increased 6 times). On December 26, 2009, the first long Wuhan-Guangzhou railway was put into operation (1,069 km, reducing travel time from 10 hours to 3 hours at train speeds up to 350 km/h).

<p>The 12th Five-Year Plan (2011-2015)</p>	<p>- Construction of new railways in Taiyuan (North China), Lanzhou (Northwest China), Guangzhou (South China), Shenyang (Northeast China), Xiamen (East China), Changzhou (East China). The length of railways by 2015 amounted to 112 thousand km, which is 22.6% more than in 2010, of which high-speed roads accounted for 16 thousand km, which is 60% of all high-speed roads in the world. - 13 thousand km of newly built railways (5 thousand km at a speed of 250-350 km/h and 8 thousand km at a speed of 200-250 km/h). These high-speed highways form a full-fledged network of high-speed railways that connects the economically developed areas of the Yangtze River Delta, the Zhujiang River Delta and the «economic ring» of Bohai Bay.</p>
<p>The 13th Five-Year Plan (2016-2020)</p>	<p>- A group of mainline railways has been opened, including the Haolebaoji-Jian, Lanzhou-Chongqing and Quzhou-Ninde lines (increasing the supply of freight transport services). - Sichuan-Tibetan Railway (from Chengdu, the capital of Sichuan Province, to Lhasa, the capital of Tibet). - In 2017, in Zhejiang Province, the construction of the Hangzhou—Taizhou HSR with a length of 269 km (the first HSR, the construction of which is carried out within the framework of a public-private partnership).</p>
<p>Sources used:</p>	<p>- China Internet Information Center, http://russian.china.org.cn, last accessed 2023/05/22. - Zhong Ji.: The impact of the construction of the PRC railway — Kyrgyzstan-Uzbekistan on the economic development of Xinjiang. <i>Economic geography</i> 29 (8), 1271-1272 (2009). - Selishhev A., Selishhev N.: Economic therapy the Chinese way. <i>Problems of Modern Economics</i> 4 (72), 171-176 (2019). - Wang Fang.: Dynamic development of China’s high-speed railways 5 (67), 1-34. - Lan Xinzhen: A Fast Train to the Future. <i>Beijing Review</i>, p. 29 (2017). - Shi Yuanchao.: Strategy for the development of freight marketing by rail. <i>Railway cargo transportation</i> (10), 22-24 (2018).</p>

Compiled by: the data is shown in the table

Beginning with the **10th Five-Year Plan (2001-2005)**, the PRC is entering a period of rapid development of rail transport. The objectives for the development of the transport component during this period are reflected in the report on the implementation of the socio-economic development plan for 2001:

- the development of *the transport infrastructure of the western regions* and the promotion of their independent development is a priority. This policy resulted in a doubling of capacity (up to 100 million tons) through the construction of a new rail network and electrification of existing railroads

- strengthening oversight over the use of funds from state loans (compliance with the order of capital construction, the correct choice of direction of investment in construction facilities, the establishment of preparatory work)
- updating the rolling stock

In 2004, the PRC State Council approved the first in the reform period “*Mid- and long-term plan for the construction of the PRC railway network*” the target indicator of which is the total length of the operated railroads [25].

Since 2005, *specialized railroad operation* has been introduced, due to the fact that mixed operation was causing difficulties with operation and repair. This transition has accelerated the reform of the transportation management system [22]

In the **11th Five-Year Plan** (2006-2010), *the introduction of technology in the transport complex* to improve the efficiency of rail transport by increasing the speed of trains comes to the fore. There is a need to accelerate the construction of special railroads to transport coal from Shanxi, Shaanxi and western Inner Mongolia to central China.

During the 11th Five-Year Plan period, the total operating length of PRC railroads increased by 17.3%, reaching 91.2 thousand km in 2010. This made it possible to partially relieve congested railways. Capital investments by the central and local governments amounted to about 2.2 trillion yuan, and by the private sector - 160 billion yuan. Thirteen.3 kilometers of railroads were electrified. There is more coordinated regional development

The **12th Five-Year plan** (2011-2015) is a transition to *transport integration*, “a golden period of transport development characterized by high-quality transformation and development.” The desire for a policy of “reform and openness” is the driving force of sustainable progress in this industry [24]. In this connection, the central position is occupied by the promotion of cooperation within the framework of the “One Belt, One Road” initiative, which is considered as a plan for the development of the national economy. Accordingly, the main investments were directed to the development of the routes of the Silk Road Economic Belt, covering the central and western regions of the country.

The most important element in the implementation of the Silk Road Economic Belt initiative the development of the transport system, as well as the expansion and deepening of transport interconnections between China and the member states of the initiative.

By the end of 2015, the total length of railroads was 121,000 km, making China the second largest railway in the world (after the United States). In particular, the length of high-speed railroads amounted to 19 thousand km (60% of all high-speed railroads in the world), according to this figure China leads the world [24].

In addition, the expansion of rail transport contributes to the creation of a more environmentally friendly logistics of the future, which corresponds to one of the

main agendas of this five-year plan - the transition to energy modernization of China [16].

Also in 2013, *the first step toward operating on a commercial basis* was taken, marking a new milestone in the ongoing process of rail transport reform. The China Railway Corporation (China Railway Corporation) was established on March 14, 2013, replacing MoR, took over the commercial functions (including safety, technical standards, quality of service) of the former unit, and became accountable to the State Council of the PRC and the Ministry of Transport (which took over the planning functions of MoR), with management transferred to the State Railway Administration [3]. The reform program also included a greater diversification of freight tariffs, the creation of a railway development fund to rationalize financing for further development of railways.

The 13th Five-Year Plan (2016-2020): the strategic target for this period is *to achieve China's leadership in the creation of high-speed railroads*. This was one of the impulses for the further development of China's economy. To this end, two leading manufacturers of high-speed rolling stock, CSR Corporation Limited and China CNR, were merged by order of the State Council of China. The merger allowed to weaken the competition between them and strengthen China's competitive position before international companies [21]. The new China Railway Rolling Stock Corporation, with a total asset value of 300 billion yuan, has taken the position of the largest international rail transport company. By 2016, CRRC had already made 15% of global sales, shipping its products to 101 countries around the world [18].

Besides, in 2016 *the Mid- and Long-Term Railway Network Development Plan* was revised, setting the following targets for the length of the high-speed network: 30,000 km by 2020, 38,000 by 2025, and 45,000 by 2030 [20].

Objectives for **the 14th five-year plan (2021-2025)** are *digitalization, expansion of transport infrastructure with neighboring countries, development of new routes within international rail freight traffic, promotion of high-quality services in international transportation, expansion of export of rolling stock equipment, development of unmanned technologies in transport*. The "Made in China 2025" plan pays special attention to the development of the industry's own developments.

Development plans up to 2035 are also outlined. There are plans to form a global logistics ring "1-2-3" for cargo transportation. It will make it possible to deliver mail sent by express services to its destination in China in one day, and to neighboring countries and major cities of the world in two and three days, respectively. In the future, China also aims to build high-speed railroads between China, Russia and other neighboring countries [19].

The above allows us to draw the following **conclusions**:

- Development and improvement of PRC transport system is on the list of the most important tasks in all five-year plans
- The PRC government gives priority to the development of transport infrastructure, introduction of innovations, solution of regional transport problems
- Improvement of PRC's transport system will speed up international transport of goods from China (more rapid delivery of goods to the economic frontier of the country).
- Improvement of the transport system is conducive to resolving regional problems (development of communications with remote and underdeveloped regions and acceleration of their integration into the modern economic processes).
- China's transport system is also one of the important components of the mechanism for implementing China's Silk Road Economic Belt initiative.

References

1. ADB (Asian Development Bank). *Transport efficiency through logistics development* (2012)
2. ADB (Asian Development Bank). *Technical Assistance, People's Republic of China: Railway Passenger and Freight Policy Reform Study*, (2005).
3. Bordie R., Wilson S., Kuang J.: *The Importance, Development and Reform Challenges of China's Rail Sector. Deepening Reform for China's Long-term Growth and Development*, 477-506 (2014).
4. Demurger S.: *Infrastructure Development and Economic Growth: An Explanation for Regional Disparities in China. Journal of Comparative Economics* (29), 95-117 (2001).
5. Fan Ye.: *Analysis of the influencing factors of transportation growth pattern. Comprehensive Transportation* (11), 5-12 (2006).
6. Fengjun Jin, Jingxue Ding, Jiaoe Wang.: *Transportation Development Transition in China. Chinese Geographical Science* 22(3), 319-333 (2012).
7. Fengjun Jin.: *Research on spatial organization and efficiency of economic geography and its significance. World Regional Studies*, 16(4): 55-59. (2016).
8. *Informational materials (5): The ninth five-year plan of economic and social development of the People's Republic of China and a long-term program for the period up to 2010* (1998).
9. Sazonov S.: *China's transport system reform and the global financial and economic crisis. Problems of the Far East* (2), 57-72 (2010).

10. Sazonov S.: *Transport of the People's Republic of China*. Krug, Moscow (2012).

11. Shenggen Fan, Connie Chan-Kang.: *Road Development, Economic Growth, and Poverty Reduction in China*. International Food Policy Research Institute, Washington (2004).

12. Solodkij A., Gorev A., Bondareva E.: *Transport infrastructure*. 2nd edn, Yurayt, Moscow (2022).

13. *The success of Chinese railways during the 8th five-year plan*. Organization for cooperation between railways, Warsaw (1996).

14. Wang Fang.: *Dynamic development of China's high-speed railways* 5 (67), 1-34.

15. Wu, J. H., Nash, C.: *Railway Reform in China*. Working Paper. Institute of Transport Studies, University of Leeds, Leeds, UK. Working Paper 524 1-39 (1998).

16. Yagya T.: *Features and results of the development of the twelfth five-year plan (2011-2015) in China*. *Russia in the global world* 10 (33), 471-482 (2017).

17. Yue.: *On an Innovation Track*. Scientific breakthroughs pump steam into China's railway-building spree. *Beijing Review* (2009).

18. *China Eastern launches Shanghai-Chicago direct flight service*, <http://www.chinadaily.com.cn/business>, last accessed 2023/06/23.

19. *China has published a plan for the development of the transport system by 2025*, ERAI. <https://index1520.com/analytics>, last accessed 2023/05/11.

20. *China's High-Speed Rail Development*, <https://index1520.com/analytics>, last accessed 2023/04/11.

21. *China's largest manufacturers of high-speed trains CNR and CSR may merge*, <https://tass.ru/ekonomika>, last accessed 2023/07/01.

22. *Improvement of the integrated transport system*. Outline of the tenth five-year plan for the national economic and social development of the People's Republic, <http://www.gov.cn/gongbao>, last accessed 2023/06/23.

23. *Sustainable transport development in China*, the State Council Information Office of the People's Republic of China December 2020, <http://www.gov.cn/gongbao>, last accessed 2023/06/23.

24. 中长期铁路网规划, <https://baike.baidu.com/item/中长期铁路网规划/62609349>, last accessed 2023/06/21.

25. 国家统计局, <http://www.stats.gov.cn>, last accessed 2023/04/15.

财政资源的形成和使用的概念方面

CONCEPTUAL ASPECTS OF THE FORMATION AND USE OF FINANCIAL RESOURCES

Mustafayev Aziz Agasalimovich

*Candidate of Economic Sciences, Senior Researcher
Institute of Socio-Economic and Energy Problems of the North of the
Federal Research Center of the Komi Scientific Center of the Ural
Branch of the Russian Academy of Sciences, Syktyvkar*

Zahariev Radoslav Lyubomirov

*Senior Engineer, Postgraduate Student
Institute of Socio-Economic and Energy Problems of the North, Federal
Research Center of the Komi Scientific Center of the Ural Branch of the
Russian Academy of Sciences, Syktyvkar*

抽象的。本文论述了财政资源的形成、支出和使用的实际问题。研究的主要目的是揭示金融关系形成的关键方面，确定在创造真实金融资源及其有效利用过程中转变这些关系的机制。本文的独创性在于，金融资源的形成和使用问题不能仅仅放在一个背景下考虑，而应该分开考虑。这将作为详细说明解决具体问题过程中必要理由的基础。

关键词：金融、理性、机制、转型、实践方法、总体性、参数、动员。

Abstract. *The article deals with the actual problems of the formation, expenditure and use of financial resources. The main objective of the study is the disclosure of key aspects of the formation of financial relations, the identification of the mechanism for transforming these relations in the creation of real financial resources and their effective use. The originality of the article lies in the fact that the problem of formation and use of financial resources should be considered not only in a single context, but also separately. This will serve as the basis for detailing the necessary justifications in the processes of solving specific problems.*

Keywords: *finance, rational, mechanisms, transformation, practical approaches, totality, parameters, mobilization.*

An important task for accelerating the socio-economic transformation of the national economic complex of the country is the assessment of the improvement of its financial situation - streamlining the main parameters of financing and func-

tioning of various spheres, complexes and enterprises. Periodic analysis of the financial activities of individual spheres and enterprises, as a rule, puts forward requirements for the development of more advanced methods and mechanisms used not only in the new economic conditions, but also in the implementation of large-scale and long-term projects. Consequently, the efficiency of economic activity of spheres and enterprises of the economy is closely related to the classification of financial resources, optimization of the technological and specific structure of capital in accordance with the needs of specific types of economic activity. Regular improvement and implementation of methods and mechanisms of financial and economic activity of spheres and enterprises creates a favorable atmosphere for the systematic development and management of the economy.

In a generalized view, we note that the efficiency of the economy largely depends on the degree of formation of its financial relations, on the manageability and movement of financial resources - on the expected financial well-being of various spheres and enterprises. Proceeding from this, the problem of periodic analysis of financial relations, the organization of finance, and the rational use of financial resources are of particular relevance. The main objective of the study is to develop new recommendations that can accelerate financial transformations in the economy. Based on the foregoing, the subject of the study is a comprehensive analysis of the state and movement of these resources. The object of the study is progressive principles and methods, as well as favorable conditions that can improve financial relations and increase the efficiency of financial resources.

The aim of the study is a methodological approach to the analysis of finance and financial resources, to study the effectiveness of interrelated and interdependent methods and mechanisms in real-life phenomena and processes of financial activity – establishing the role (assessment) of the main factors (positive or negative) in ensuring the effectiveness of financial resources in the economy. The results of such an analysis, as a rule, are clearly reflected in forecast calculations and programs for the long-term development of the economy. The proposed recommendations on this issue predetermine the further development of specific areas and enterprises, clarify the possibilities of obtaining appropriate profits and income.

Of particular importance in the study is the achievement of solutions to the main problems, the improvement of the principles of management of financial and economic activities of specific areas and enterprises. This makes it possible to reveal the essence of the circulation and turnover of operated capital assets, to identify the ongoing changes in the movement of financial resources of specific economic entities. As a rule, only a reliable analysis and assessment of aggregate economic relations, especially the processes of creating various monetary funds, their distribution, expenditure and use, makes it possible to predetermine the further pace of economic activity of enterprises, production volumes and income

generation. This circumstance makes it possible to identify the degree of changes in the quantitative and qualitative parameters of the formed resource potential. Regular analysis and evaluation of financial resources, giving rise to many acute problems, at the same time creates favorable conditions for expanding the scale of effective economic activity.

It should be emphasized that due to periodic changes in market conditions, there is a growing need to improve the conceptual aspects of aggregate economic relations in the economy. Since among the key components in the development of the economy, a special place belongs to finance (aggregate economic relations), the improvement of the functional parameters of financial resources (material values of these relations). Therefore, the presented circumstance requires a more detailed study of the financial activities of various spheres and enterprises in the economy, the implementation of new theoretical, methodological and practical approaches to the analysis and evaluation of finance and financial resources. Improving the financial situation of enterprises, in turn, dictates the use of more progressive methods, techniques and techniques for managing the national economic complex.

We emphasize that this problem was dealt with by many outstanding foreign economists - A. Smith, D. Ricardo, A. Marshall, A. Carter and others, as well as domestic economists. The study shows that today most authors do not have a single definition of finance and financial resources. There are different opinions about the essence of these categories. Some believe that financial resources are cash income, borrowed funds and savings at the disposal of the enterprise. Others believe that financial resources are the capital of an enterprise, formed at the expense of its assets and intended for the development of production and trade processes. Most scientists believe that financial resources are monetary funds to support production processes and perform other socio-economic tasks. Proponents of the staged movement of financial resources note that this is capital in cash, etc.

For example, according to A.M. Babich and L.N. Pavlova, "financial resources are funds generated by economic entities, at the expense of their income and receipts and directed to the purpose of expanded reproduction." At the same time, they note that "finance expresses economic relations arising in real money circulation on the basis of the accumulation of monetary capital, associated with its distribution and redistribution through centralized and decentralized funds of funds, in order to ensure expanded reproduction in various sectors of the economy." [1, p. 39-40].

We emphasize that in the analysis and evaluation of finance and financial resources, the main attention should be paid not only to the sources of financing of enterprises, but also to the degree of organic construction of principles and the creation of favorable conditions for their effective use. When assessing financial

relations, financial security (reflection of financial relations in the formed sources of funds necessary to finance economic and other activities) and the financial condition of enterprises, it is necessary to rely not only on economic entities, but also on the well-being of financial institutions, strengthening their close relationship with the real sectors of the economy. In this regard, a special place belongs to state financial structures, a better financial policy for various sectors of the economy. Consequently, in the context of the transition to market relations, the solution of a number of financial and economic issues requires in-depth development.

The latter is the basis for effective financing of enterprises, accelerating the circulation of operating assets and further achieving sustainable development in the economy. It should be especially noted that the development and use of progressive methods of rational intersectoral allocation of resources and ensuring the effectiveness of vertical and horizontal relationships between them is the guarantor of ensuring a synergistic effect. As a rule, optimization options for integrating industries make it possible to solve a set of financial problems, ensure the efficiency of the resources used and increase the level of renewal of production capacities. We must not forget that the improvement of the methodology of finance and financial resources and the development of practical recommendations in this area should take into account the sectoral features in the economy, correspond to their specifics of functioning, as well as market requirements.

In this regard, E.M. Bozhok notes that the analysis and evaluation of the financial resources of the enterprise consists in solving two interrelated tasks. The first is to obtain a small number of key (most informative) parameters that give an objective picture of the financial condition of both specific industries and local enterprises. The logical structure of the construction of such parameters will include several stages: the calculation of parameters and the identification of their changes in the temporal and spatial context; Parameter identification. The second task includes the analysis of factors affecting the financial condition of the enterprise, and the possibility of changing it on the basis of the results obtained, both in value and in kind. The basis of an effective methodology for analyzing and evaluating the financial resources of an enterprise is the implementation of procedures in the appropriate sequence and in full, which will fully assess the effectiveness and quality of the processes of formation, distribution, placement and use of financial resources of the enterprise [2, p. 18].

In our opinion, all developments and existing definitions on this problem not only give an idea of finance and financial resources, but also help to reveal its essence, determine the role and significance in economic cycles. Analyzing the opinion of various authors about the essence of finance and financial resources, we come to the conclusion that finance is a set of economic (more precisely, social) relations in the process of creating centralized and non-centralized monetary funds

and their expenditure (distribution and redistribution) in order to ensure the life of all spheres of the economy. If, in the broad sense of the word, finance is a set of economic relations, then financial resources are the result of the materialization (implementation) of these relations - the monetary savings of enterprises at their disposal to fulfill debt obligations to the financial and credit system and solve the necessary socio-economic, environmental, infrastructural, demographic and other tasks.

Hence the conclusion that financial resources are funds received on the basis of emerging financial relations - the materialization of these relations in the formed and used resources. In other words, financial resources are material carriers of financial relations. Therefore, financial resources act as an object of financial relations. Sound financial policy and its effective implementation is the basis for improving financial relations. Since financial policy is understood as a set of methods, techniques and methods for the formation and implementation of financial ideology, building a system of financial relations, improving the functional system of financial management in the economy.

Analyzing the opinions of various authors on the essence of financial resources, we come to the conclusion that this category should be considered from different positions and with different details. Since it is subject to systemically transformable cycles, a kind of metamorphosis - the transition from one form to another with the acquisition of a new appearance and functions. In terms of their consumer value and functional characteristics, financial resources are an integral part of the life of all spheres and enterprises of the economy. Based on the above statements, by their objective nature, financial resources are subject to a complex functional system, since in the processes of formation and use, these resources have the ability to accumulate, transform into another form and are capable of increment [3, p. 358-359].

In our opinion, the concept of “financial resources” is universal, has a changing appearance depending on its own functional diversity and the specific characteristics of the life of various spheres and enterprises. The disclosure of the essence of these resources is closely related to the processes of reproduction of economic entities and therefore largely depends on the location and movement - from the moment of formation of internal external sources of financing to the moment of organization and acquisition of the property complex and the implementation of the main and auxiliary activities, as well as the sale of marketable products.

If we pay attention to the cyclical movement of financial resources, we note that at the initial stage (at the stage of investment), they, representing cash, act as investments (money capital) and are directed to the acquisition of certain types of production assets. At the next stage, the acquired assets are included in the production processes and become productive capital, the further movement of which

requires an increase in the value of capital assets. At the last stage of the cycle (after the sale of manufactured marketable products), these resources are formed in the form of new funds. The received monetary resources, coming to the settlement accounts of the enterprise, restore (form) a fund of financial resources for distribution and redistribution, resumption of subsequent economic activities. From this point of view, money is a fundamental economic category, on the basis of which complex systems of economic relationships between participants in the processes of expanded reproduction (covering all its aspects) are provided - production, distribution, consumption, exchange of material goods, services and works.

It should be concluded that, on the one hand, financial resources act as a form of value served by enterprises, on the other hand, as carriers of aggregate economic relations that develop between participants at different levels and coordinates of their economic activity. Based on the disclosure of the essence of financial resources, we note that in material form they carry the attributes of property and are used in the processes of ensuring expanded reproduction. The equivalent of assessing their significance is money, which serves as a measure of value. Monetary valuation more clearly characterizes the size of the fund of financial resources, which are formed from different sources and distributed (redistributed) for conducting economic activities.

Thus, financial resources are the result of aggregate economic relations associated with the mobilization of funds and their expenditure - the acquisition of the necessary resources to ensure efficiency in the circulation of operating assets, as well as the successful sale of finished marketable products. Of great importance is the financial activity (mediated by financial relations), ensuring progressive changes in the quantitative and qualitative parameters of the resource potential - increasing the volume and improving the qualitative characteristics of the capital assets used, as well as the forms of economic activity.

In a generalized view, in order to achieve the socio-economic sustainability of enterprises, financial resources should be used to ensure expanded reproduction - the resumption of production in all economic cycles and coordinates on an increasing scale. At the same time, the effectiveness must comply with the principles and conditions of management that ensure the excess of the constant flow of income over periodic expenses. Particular attention should be paid to the change in the course of financial policy in the field of external sources of financing, the periodic improvement of mechanisms for structuring the internal financial resources of enterprises (mainly at the expense of profit and depreciation).

The study shows that in connection with this goal, it is necessary to solve a set of economic tasks: a) to study and enrich the theoretical, methodological and practical foundations of financial and economic relations in the economy, depending on the industry specifics and specific economic activity; b) assess the actual finan-

cial condition and general economic activities of various spheres and enterprises; c) substantiate new concepts that contribute to the improvement of the financial condition of enterprises; d) determine the growth of the level of profitability, profitability, solvency and competitiveness of enterprises; e) optimize the proportions of external and internal sources of financing; f) observe the effectiveness of financial proportions in the intersectoral context, ensure the balanced development of economic entities, etc.

Summing up the results of the study, it can be concluded that depending on the current external financial situation, changes in the probabilities of obtaining one's own profit and income, sectoral specifics of functioning, as well as possible transformations in intersectoral economic relations, the conceptual tasks of analyzing and evaluating finance and financial resources have a changing appearance and are constantly being improved. This requires the use of more advanced methods and mechanisms that take into account not only the formation and effective use of financial resources on the basis of perfect relationships, but also market requirements.

References

1. Babich A.M., Pavlova L.N. *Fundamentals of Finance and Credit // State and Municipal Finances. Textbook. Second edition, M.: UNITY-DANA, 2002. 703 p.*
2. Bozhok E.M. *Methodological approaches to the assessment of financial resources of the enterprise // Bulletin of the Belarusian State Agricultural Academy. 2016. №4. P. 16 – 18*
3. Mustafayev A.A. *Conceptual aspects of the formation and use of financial resources of the agro-industrial complex of the Northern region // Proceedings of the V All-Russian Scientific Seminar "Actual Problems, Directions and Mechanisms for the Development of the Productive Forces of the North - 2016", Syktyvkar, Part I. 2016. 392 p.*

DOI 10.34660/INF.2023.53.91.088

加入上合组织后白俄罗斯数字经济发展新机遇

**NEW OPPORTUNITIES FOR THE DEVELOPMENT OF THE
DIGITAL ECONOMY IN BELARUS AFTER JOINING THE SCO**

Li Rong

PhD student

Belarussian State University, Minsk, Republic of Belarus

Gospodarik Catherine

Candidate of Economic Sciences, Associate Professor,

Head of the Department

Professor

Financial University under the Government of Russian Federation,

Moscow, Russia

抽象的。文章对[1-5]中的理论进行了推广，从最佳经验出发，从实施数字化转型的角度分析了白俄罗斯加入上海合作组织的前景。受疫情影响，上合组织成员国普遍进入数字化转型期，努力探索适合自身国情的经济模式。这对于白俄罗斯打破西方对其经济封锁、走出发展困境、推动数字经济发展、弥合数字鸿沟、加快白俄罗斯企业数字化转型步伐、适应新形势具有重要意义。新的经济方针。为了更好地分析这一问题，本文从数字经济基础设施发展情况、上合组织成员国数字经济发展现状、数字经济目标等方面进行了探讨，以理顺数字经济带来的红利。白俄罗斯加入上合组织后，加快将数字经济作为白俄罗斯经济增长的动力，通过“一带一路”建设积极推进丝绸之路经济带核心区建设^①，推动上合组织与“一带一路”沿线国家、欧亚经济联盟国家互联互通、互利合作、共同发展。

关键词：数字经济；上合组织；一带一路；经济增长；数字化转型。

Abstract. *The article promotes theories started in [1-5] and analyses the perspectives of accessing of Belarus in the Shanghai Cooperation Organization from the point of implementing of digital transformation based on the best experiences. The SCO member states are generally entering a period of digital transformation due to the epidemic and are striving to explore economic models suitable for their own conditions. This is important for Belarus to break the Western blockade on its economy, to get out of the development dilemma, to promote the development of digital economy, to bridge the digital divide, to accelerate the pace of digital transformation of Belarussian companies and to adapt to the new economic approach. In order to better analyze this issue, the paper looks at the*

development of digital economy infrastructure and the current situation of digital economy development in the SCO member states, the goals of digital economy, etc. In order to rationalize the dividends brought by the digital economy after Belarus' accession to the SCO, to accelerate the digital economy as a driving force for economic growth in Belarus, to actively promote the construction of the core zone of the Silk Road Economic Belt through the construction of the "One Belt, One Road", to promote the interconnection, mutually beneficial cooperation and joint development of the SCO, the countries along the Belt and Road, and the countries of the Eurasian Economic Union.

Keywords: *Digital Economy; SCO; Belt and Road; Economic Growth; Digital Transformation.*

With the rapid changes in the international situation and geopolitical influences, more and more countries have become interested in participating in the Shanghai Cooperation Organisation (SCO). The SCO is increasing its authority and influence through rapid development and has now become one of the most influential international organizations. With the current accession of Iran (July 04, 2023) to the SCO, the SCO member states cover nearly a quarter of the earth's land area, with a total population of more than 3.2 billion, accounting for about 44% of the global population, and a combined GDP of more than 25% of the global total, representing a huge market capacity. Bilateral trade and economic relations among the member states are developing rapidly, and the share of trade volume in the total foreign trade volume of each member state is increasing year by year, and the trade volume is reaching record highs, and with the increasing number of countries applying for SCO membership, it has shown a large market capacity and development potential.

Current economic situation of SCO member states

The year 2022 was a landmark year for the SCO, becoming the 20th anniversary of the signing of the SCO Charter and the 15th anniversary of the signing of the treaty on long-term good-neighborliness, friendship and cooperation among member states. Although the SCO was founded mainly for cooperation on security issues, as the world's most extensive and populous comprehensive regional cooperation organization, the results of economic and trade cooperation among SCO countries have shown strong momentum in the global economic and trade downturn under the influence of the pandemic and Russia-Ukraine battlefield factors. This was confirmed by the package of cooperation documents signed during the "Samarkand Summit".

The total value of trade between SCO member states has increased nearly 100 times in 20 years, and its share in global trade value has grown from 5.4% in 2001 to 17.5% in 2020. In 2021, China's trade with other SCO member states reached

\$343.3 billion, up 40% year-on-year, 28 times more than in 2001, when the SCO was first established. The momentum continues and trade between SCO member states will reach \$651 billion in 2022. According to Chinese statistics, China's trade with other SCO member states reached 1.73 trillion yuan in the first eight months of 2022, up 26% year-on-year, more than twice the growth rate of China's foreign trade as a whole. Among them, the trade volume hit a record monthly high in August.

According to the World Bank's assessment, the combined GDP by PPP in current international dollars of SCO member states is about \$31.1 trillion in 2022, accounting for nearly one third of global GDP by PPP. In the same year, the trade volume among SCO member states reached \$651 billion. The influence of each SCO member country in the SCO is changing with the frequent trade and economic exchanges.

The national wealth of the SCO member states has evolved differently in the 20 years since 2000, with China and India experiencing a dramatic change in GDP per capita, which underlines their economic dynamism and has led to the development of the economies of other SCO member states, resulting in the rising position of SCO member states in the global economy.

SCO has expanded from the initial six member states to more member states, observer countries and dialogue partners; the structure and mode of mutual trade and investment among member states have been optimized and innovated, with high-tech products and cross-border e-commerce becoming new trade highlights, and the areas of cooperation have become richer, with digital economy, telemedicine, green energy, green agriculture and other fields becoming growth points for future economic growth in cooperation.

The superposition effect of Belt and Road Initiative and SCO

Most of the SCO member states and observer countries are located in countries along the "Belt and Road", which is the core area of the SCO and is also the road route and important hub of the "Belt and Road", which is conducive to the SCO to better play its own advantages in economic cooperation, not only the friendship of the Silk Road civilization, but also the establishment of a mutually beneficial cooperation and mutual assistance partnership in the contemporary world landscape. China's "One Belt, One Road" initiative provides an excellent opportunity for Belarus to once again become an important node on the European continent and an important transit point in the region. With the help of the "Belt and Road", China and the SCO member states have made leaps and bounds in trade and financial flows. By the end of 2017, the total investment between China and the member states had exceeded \$84 billion, Chinese enterprises had invested nearly \$15 billion in the region, and the member states had invested more than \$2 billion in China, covering many fields such as agriculture, manufacturing, and infrastructure.

The SCO not only cooperates closely in political, economic and cultural spheres and has established close relations with the CSTO, CIS and ASEAN, but also cooperates with the implementation of the “Greater Eurasian Partnership”, a large-scale integration project proposed by Russian President Vladimir Putin. There are two reasons why trade between China’s Belt and Road and the other SCO member states has grown significantly in recent years: economic complementarities are strong, with China and India representing major resource consumers and importers within the SCO, while Russia and Iran, Kazakhstan and other countries are key resource exporters. Russia and Iran, for example, have the world’s first and second largest recoverable natural gas reserves, 37.4 and 32.1 trillion cubic meters, respectively, which account for 37% of the world’s natural gas reserves. China is now the world’s top importer of natural gas (including LNG), and India’s imports are rising rapidly. Russia, Kazakhstan and other countries export mainly energy and mineral resources, and at the same time have a large demand for imports of electromechanical products, which fits China’s needs; the number of China-EU trains running is increasing, ensuring a relatively stable and smooth supply chain. The scope can be fully expanded from the initial six member countries to more member countries, observer countries and dialogue partners; cooperation areas can also be enriched, with digital economy, telemedicine, green energy, green agriculture and other fields as future growth points for cooperation. China’s high-tech enterprises have a greater advantage in the cooperation on high-tech and intelligent interconnection.

Current status of SCO digital economy cooperation

With the increase of SCO members, the SCO has extended its coverage from the principle of Central Asia to South Asia and a wider region, and it is urgent to transform and upgrade the regional economic cooperation, expand the cooperation fields and cultivate new growth points, and the digital economy has become a new target for the future regional economic cooperation. In 2019, the member states signed a programmatic document on regional economic cooperation, the Outline of Multilateral Economic and Trade Cooperation among the SCO Member States, which is the first time that the SCO has included digital economy as a new direction of cooperation, and the digital economy has become the focus of attention of the SCO member states (Table 1).

Table 1*SCO digital economy key areas of cooperation document*

Year	Sphere field	Key programs	Key points/particulars
June 14, 2019	digitalization & ICT	«Concept of the SCO Member States on Cooperation in the Field of digitalization and ICT»	Realize the level of national network and information security in the SCO region, and realize all-round interconnection. Establish the SCO National 5G Application Industry Fund to accelerate the construction and operation of 5G applications in the SCO countries, strengthen regional cooperation in new technologies and new scenarios, increase the number of hardware equipment and the accessibility of digital services in various countries, and improve the degree of trade and investment facilitation.
September 17, 2021	Technology & Innovation	«Statement of the Council of Heads of State of the SCO Member States on Strengthening Cooperation in the Field of Science, Technology and Innovation»	Carry out joint scientific research, experience exchange among scientists and scientific organizations, find new economic growth points and solutions to social challenges.
November 11, 2020		«Statement of the Council of Heads of State of the Shanghai Cooperation Organization on Cooperation in the Field of the Digital Economy»	Carry out digital and ICT cooperation in the fields of industry, transportation, agriculture, health, education, tourism, energy, trade, finance and customs; Study the possibility of implementing projects for the creation of new digital enterprises, including in the fields of small and medium-sized enterprises, personnel training, etc.; Study the possibility of scientific research and planning cooperation in the fields of cutting-edge digital technologies, artificial intelligence, robotics, Internet of Things, development of innovation clusters and technology parks, incubation and development of start-ups, application of modern information and communication

			technologies in national governance and government services.
November 25, 2021	Digital technologies	Action plan for the idea of cooperation among SCO member states in the field of digitalization and ICT.	Strengthen the digital economy infrastructure and innovative technology industry cooperation among member states, launch new digital projects in the SCO region, continue to jointly study the establishment of a technology transfer center for SCO member states in Qingdao, and jointly develop an innovation ecosystem, with China Enterprises cooperate, introduce modern technology, and provide advanced solutions for the development of broadband Internet access and mobile communication. Carry out joint scientific research, experience exchange among scientists and scientific organizations, find new economic growth points and solutions to social challenges.
September 16, 2022	E-commerce	Framework of the SCO Heads of Government Meeting - Ministers Meeting.	E-commerce and digital trade promote the economic recovery of member countries as soon as possible and improve the efficiency of digital economic cooperation. China, Kazakhstan, Uzbekistan and other countries explore new growth points for trade and innovation cooperation, deepen cooperation in «Silk Road E-commerce», rely on information technology industrial parks and related test areas to jointly build «Smart Silk Road» and «Digital Silk Road» platforms, expand investment and cooperation in high-tech fields, promote high-value-added and high-tech commodity trade, and promote trade structure upgrading and balanced development.

Source: Author collects from the SCO Declaration.

In recent years, each member country has introduced its own plan for the development of digital economy. For example, the Russian government has promulgated the Digital Economy of the Russian Federation (2030), the Kazakh government has formulated the Digital Kazakhstan, the Uzbek government has promulgated

the Digital Uzbekistan, Kyrgyzstan has formulated the Digital Kyrgyzstan, the Indian government has formulated the Digital India, the Pakistan government has formulated the Digital Pakistan, and the Chinese government has promulgated the “14th Five-Year Plan” for the development of digital economy (Table 2). These plans have clearly defined the goals and tasks for the future development of digital economy in each country, and laid an important foundation for digital economy cooperation among member countries.

Table 2.
digital economy strategies of SCO member states in recent years

Country	Strategy Name	Publications Time
China	Actively promote the “Internet +» action guidance	2015
India	Digital India	2015
China	Action Plan for Promoting the Development of Big Data	2015
China	National Information Development Strategy Outline	2016
Pakistan	2030 Agenda for Sustainable Development	2016
Russia	Digital economy of the Russian Federation	2017
Kazakhstan	Digital Kazakhstan «2018-2022»	2017
kyrgyzstan	«DIGITAL KYRGYZSTAN « 2019-2023	2018
Pakistan	‘Digital Pakistan policy’	2018
China	Development Plan for Digital Agriculture and Rural Areas	2019
Russia	National Strategy for the Development of Artificial Intelligence for the period until 2030	2019
Tajikistan	Digital economy concept of the Republic of Tajikistan	2019
Iran	Digital Iran National Road map Executive Summary 2020-2025	2019
Pakistan	Digital Pakistan Vision	2019
China	The CPC Central Committee’s proposals for formulating the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and the Long- Range Objectives Through the Year 2035	2020
Uzbekistan	Digital Uzbekistan 2030 Strategy	2020
China	Strengthening «From 0 to 1» Basic Research Work Plan	2021
Kazakhstan	Digital lifestyle (Digitel) 2021-2023	2021
Belarus	Digital Development of Belarus 2021 - 2025	2021

Source: compiled by the author.

Status of digital infrastructure in SCO member states

The UNCTAD Digital Economy Report “Value Creation and Capture”: Implications for Developing Countries” states that the drivers of the expansion of

the digital economy are the collection, use and analysis of digital data based on a strong data infrastructure.

The experience of the development of digital economy powerhouses shows that the level of digital infrastructure is positively correlated with the level of digital economy development (Graham, 2019). The digital economy infrastructure of SCO member countries varies greatly due to the level of socio-economic development, and if we measure SCO member countries as digital consumers and digital exporters, they are all digital consumers. IMD's World Digital Competitiveness Ranking 2022, which measures countries' ability to use digital technologies as a key driver of broad socio-economic transformation and their readiness for digital transformation, shows that China, the highest ranked SCO member country, is only 15th. While Kazakhstan was ranked 32nd, India was ranked 46th. According to digital commerce 360's latest analysis of the 100 largest online marketplaces by 2021, e-commerce accelerated by five years due to the corona-virus pandemic, with sales in the world's top e-commerce marketplaces growing 18% annually in 2021, accounting for more than 90% of global market sales and \$2.1 trillion in sales. More than half of these markets are located in North America, another 22 in Europe, and the remaining seven in Latin America, the Middle East, Africa and Asia. 41% of global online retail spending in 2021 will be through just three platforms - Taobao, Tmall and Amazon - and Ozon in Russia in the SCO will be the fastest growing market in 2021, with GMV growth of more than 125% year-over-year.

Significant differences in network levels among SCO member states

The data value divide has emerged, mainly in the "data value chain", where the lack of ability to transform data into digital intelligence and business opportunities in a timely manner may reduce them to raw data providers for global digital platforms. The digital economy cannot develop without the ability to collect, process and apply digital data at high transmission rates, which are closely linked to the speed of the Internet. According to the United Nations Conference on Trade and Development, global Internet Protocol (IP) traffic, which represents data flows, reached 45,000 gigabytes per second in 2017, a 450-fold increase compared to 1999, and with the growth of the Internet it is expected that global IP traffic will reach 150,700 gigabytes per second by 2022, a 3,3-fold increase compared to 2017, which will create In terms of mobile Internet speed, China is at a medium-high level of development, India, Russia, Kazakhstan, Pakistan, Kyrgyzstan are at a medium level of development, Uzbekistan and Tajikistan are at a low level of development, and in terms of fixed Internet speed, China is the absolute leader, Russia, Kazakhstan, India are at a medium level. In terms of fixed Internet speed, China is the absolute leader, Russia, Kazakhstan, India are at the medium level.

Internet infrastructure construction in the SCO member states is lagging behind

The prerequisite for the development of the digital economy is easy access to the Internet for Internet users. Currently, the majority of Internet users in the SCO member countries access the Internet via mobile devices, which is a characteristic of Internet development in low- and middle-income countries (or regions). According to the GSMA, in 2020, 182m users in SCO member states (Russia and CIS) used mobile devices to access the Internet, with 4G accounting for only 42% of total connections. Among the SCO member states, China and Russia have the highest mobile connectivity index and are leaders, followed by Kazakhstan, Belarus, India and Kyrgyzstan. Russia and Belarus lead the consumer readiness index, and Russia and Kazakhstan outperform other member countries in affordability, while Pakistan has the lowest mobile Internet index among the SCO member states which is highly prone to the digital divide in the SCO member states.

CONCLUSION

Problems of digital economy cooperation in the Shanghai Cooperation Organization

While seeing the potential for development, there are many challenges to the development of digital economy in SCO member states. The new corona-virus epidemic, changes in the policy of the world's trading partners, the conflict on the battlefield between Russia and Ukraine, the food crisis, the debt crisis of developing countries, etc., increase the vulnerability of SCO member states to the integration of the digital economy. During this period China, Russia and Belarus were the most affected by the global economy, followed by Kazakhstan and Pakistan, and to a lesser extent by Uzbekistan, Kyrgyzstan and Tajikistan. However, the data show that SCO member states are eager to improve their competitiveness through the development of the digital economy and are willing to strengthen cooperation in the digital economy, and if inclusive and sustainable development is the goal of multilateral cooperation, a unified regional digital economy market has not yet been formed in the SCO member states' region. For example, within the SCO region, cross-border e-commerce is a new growth point for cooperation in the digital economy, but since cooperation is still limited to the bilateral level, issues such as bilateral cross-border tariffs and digital taxation need to be urgently addressed. Since the new pneumonia epidemic, a unified cross-border e-commerce platform and marketplace covering the whole region has not been formed yet, and cooperation in other areas such as smart manufacturing, smart tourism, logistics, etc. within the SCO is also limited to the bilateral level, and an integrated digital economy marketplace covering the whole region is still missing.

Implications for the development of the digital economy in Belarus

The SCO broadens Belarus' access to the Asia-Pacific region and, with the assistance of the Eurasian Economic Union, will increase its export markets and

sources of imports. Belarus has all-weather strategic cooperative relations with Russia and China. It is a member of the Eurasian Economic Union with Russia, Kazakhstan and Kyrgyzstan and actively participates in the implementation of China's 'One Belt, One Road' initiative. Tajikistan and Uzbekistan are important trade and economic partners of Belarus in the CIS. Belarus' relations with the SCO members India and Pakistan are flourishing.

Effective implementation of relevant policies is the basis for mutual trust in trade and economy. There is an urgent need for Belarus to provide policy support for deepening cooperation by implementing as soon as possible the issues of joining the SCO digital economy infrastructure, areas and ways of cooperation, standards and rules, policy transparency, network maintenance and security. At the same time, Belarus should enhance the transparency of digital economy policy, so that the process of making digital economy policy is open and inclusive. Support the release of relevant and publicly available government data at all levels of the real service, and deeply explore the potential of new technologies, products and services in the digital economy.

From the perspective of the current development of the SCO region, the possible areas of cooperation in the future are: cross-border e-commerce, smart logistics, telemedicine, smart manufacturing and digital tourism. Remote exhibition, wireless payment, etc.

References

1. Rong L., Gospodarik C. *Connotation and Development History of Digital Economy // Sustainable Development and Engineering Economics*. – 2022. – № 4. – С. 8-27.
2. Gospodarik CG, Yermak VD. *Modelling the impact the level of education and digitalisation on economic growth. Journal of the Belarusian State University. Economics*. 2022;2:81–92. Russian
3. Li Rong, Gospodarik CG. *Accelerating the change in China's economic growth model under the influence of the digital economy. Journal of the Belarusian State University. Economics*. 2022;2:93–101.
4. Gospodarik, C. *Economic opportunities of the Republic of Belarus in the SCO / Catherine Gospodarik // Bank bulletin – 2022. № 9/710. – P. 13-24.*
5. Li R., Gospodarik C.G. (2022) *The Impact of Digital Economy on Economic Growth Based on Pearson Correlation Test Analysis*. In: J. Jansen B., Liang H., Ye J. (eds) *International Conference on Cognitive based Information Processing and Applications (CIPA 2021). Lecture Notes on Data Engineering and Communications Technologies*, vol 85. Springer, Singapore. https://doi.org/10.1007/978-981-16-5854-9_3

DOI 10.34660/INF.2023.81.78.089

环境安全领域法律规制不完善
**IMPERFECT LEGAL REGULATION IN THE FIELD OF
ENVIRONMENTAL SAFETY**

Shebzukhova Tat'yana Aleksandrovna

*Doctor of Historical Sciences, Full Professor, Director
Pyatigorsk Institute (branch) of NCFU, Pyatigorsk, Russia*

Lysov Nikolai Nikolaevich

*Doctor of Juridical Sciences, Full Professor
Pyatigorsk Institute (branch) of NCFU, Pyatigorsk, Russia*

Fursov Vladimir Alekseevich

*Candidate of Juridical Sciences, Associate Professor
Pyatigorsk Institute (branch) of NCFU, Pyatigorsk, Russia*

摘要：本文讨论了俄罗斯环境安全的法律监管问题，以及建立确保国家环境安全的单一国家机构的问题。

关键词：水、空气污染；预防、揭露和调查此类犯罪的措施效率低下；环境安全；生态灾难；对这一系列社会关系的特殊法律规定。

Abstract. *The article deals with the problems of legal regulation of environmental security in Russia, the creation of a single state body that ensures environmental security in the state.*

Keywords: *pollution of water, air; low efficiency of measures to prevent, disclose and investigate crimes of this type; environmental safety; ecological disasters; special legal regulation of this range of social relations.*

The exacerbation of environmental problems in the Russian Federation, as in most countries of the world, is directly related to an increase in the level of socio-economic development of society. Intensive economic growth in the world creates tremendous pressure on the natural environment, provokes and exacerbates environmental problems, often leads to irreversible changes in the planet's ecosystem and sets the trend for unpredictable, and sometimes irreversible and fatal climate change.

The need to ensure a decent quality of life for people in the long term explains the increased attention to the issues of environmental safety of society. At the same time, the critical state of Russia's natural environment does not change.

for several decades, which has an extremely negative impact on the living conditions and health of people.

The seriousness of the environmental situation in Russia is clearly illustrated by the report of the Accounts Chamber of the Russian Federation “On the analysis of the implementation of measures to ensure the environmental safety of the Russian Federation, in terms of the elimination of objects of accumulated harm and the formation of an integrated system for handling municipal solid waste”, which showed that the level of waste processing does not exceed 7%, more than 90% - is sent to landfills and landfills, there are more than 8 thousand landfills in the country, the capacity of landfills in 32 regions will be exhausted by 2024. At the same time, most regions simply do not have the opportunity to create new landfills, and the level of waste recycling in 2019 was only 7%.¹

It is becoming more and more obvious that the achievements of scientific progress should be directed not only to improving the quality of life of society, but also to preserving the environment, which requires a person to understand the inadmissibility of using the mind and his work for self-destruction.

Here, for the sake of justice, it should be emphasized that the country’s leadership has already set a course for the transition to a circular economy.

The principle proclaimed in Article 42 of the Constitution of the Russian Federation, that everyone has the right to a favorable environment, is not supported by modern realities of life. The situation with harmful emissions remains extremely unfavorable. Half of the urban population lives in conditions of high levels of air pollution. A significant part of surface water is now assessed as “dirty” and “extremely dirty”, seven percent of the inhabitants are not provided with high-quality drinking water. In many regions, there is a continuing trend towards the deterioration of the condition of soils and lands.²

So, for example, in the rivers Neman, Pregolya, Neva, Volkhov, water is consistently characterized as “polluted”. Pollution of the water of the small rivers of the Kola Peninsula for a number of decades has been of a chronic nature and is in critical condition. A comprehensive assessment of the quality of surface waters in the Volga and Oka river basins showed that in most cases the water was assessed as “polluted” and “dirty”.

In general, the water in the river Moscow in 2021 was characterized as “dirty”. The water of most tributaries along the entire course of the river. The Yenisei was also characterized as “polluted”. The water of the rivers of Sakhalin Island is rated as “dirty”.

¹ See: Bulletin of the Accounts Chamber of the Russian Federation “Garbage Reform” No. 9, 2020, p. 7, <https://ach.gov.ru/upload/iblock/462/46234b3e3624fccbb8bace5c892f2f4.pdf#page=3>.

² See: Speech by the President of the Russian Federation Putin V.V. // Meeting of the State Council on the issue of the environmental development of the Russian Federation in the interests of future generations, December 27, 2016 <http://www.kremlin.ru/events/president/news/53602>.

In 122 cities of the Russian Federation, or 53% of the country's cities, the level of air pollution is characterized as high or very high (46% of the urban population). At the same time, the average annual concentrations of pollutants above the MAC continue to increase: benzopyrene - 1.3 times, formaldehyde - 3.1 times.

In 2021, the area of all agricultural land decreased by 56.7 thousand hectares. The area of forests destroyed by fires amounted to 57 thousand hectares (2020 - 90 thousand hectares).³

In his message to the Federal Assembly of the Federation Council on May 21, 2023, the President of the Russian Federation identified four main areas of work to ensure environmental safety - clean air, elimination of landfills, improvement of water bodies and ecotourism.

At the same time, the state of offenses in the field of ecology indicates the extremely low effectiveness of measures to prevent, detect and investigate crimes of this type. Of great concern is the high latency and low detection of environmental crimes.

Thus, the share of environmental crimes for 2022 amounted to 0.96% (2021 - 1.01%), the detection rate - 54.8 (2021 - 51.4%). As a result of a superficial investigation, in many cases the causes of crimes are not established, the perpetrators are not identified, and the necessary measures are not taken to compensate for the damage. In 2022, the number of unsolved environmental crimes was 8619 or 46%.⁴

An analysis of the enforcement of criminal legislation shows that the structure of registered environmental crimes is dominated by crimes related to illegal appropriation of natural resources. The most common are: illegal felling of trees and shrubs (Article 260 of the Criminal Code of the Russian Federation), illegal hunting of aquatic animals (Article 256 of the Criminal Code of the Russian Federation), illegal hunting (Article 258 of the Criminal Code of the Russian Federation). For example, in the Nizhny Novgorod region in 2019-2022, these crimes together accounted for more than 96% of all environmental crimes.

On the facts of pollution of atmospheric air, waters, damage to the earth, criminal cases are practically not initiated. For example, in the Nizhny Novgorod region in 2022, 1 crime was detected under Article 251 of the Criminal Code of the Russian Federation (Atmospheric pollution) (2019-2021 - 0), Article 250 of the Criminal Code of the Russian Federation (Water pollution) - 0 (2019 - 1, 2020 - 0, 2021 - 1), article 254 of the Criminal Code of the Russian Federation (damage to

³ See: State Report of the Ministry of Natural Resources and Ecology "On the state and protection of the environment of the Russian Federation in 2021" // https://www.mnr.gov.ru/docs/gosudarstvennye_doklady/gosudarstvennye_doklad_o_sostoyanii_i_ob_okhrane_okruzhayushchey_sredy_rossiyskoy_federatsii_v_2021_/?sphrase_id=617380.

⁴ See: Crime Overview 2021 and 2022 Official site of the Ministry of Internal Affairs of Russia <http://www.mvd.ru>.

the land) - 2 (2019-2, 2020-2021 - 0), article 247 of the Criminal Code of the Russian Federation (Violation of the rules for handling environmentally hazardous substances and waste) - 1 (2019 - 5, 2020 - 1, 2021 - 1).⁵

Countering crimes against environmental safety is complicated by the cross-border nature of these acts. Pollution of the natural environment cannot be limited to the geographic boundaries of one country; issues related to this problem should be resolved at the interstate level.

An example of this is the environmental disaster that occurred on the border between Russia and China on November 13, 2005, when benzene compounds (100 tons) fell into the river. Sungari as a result of an accident at a chemical plant in the city of Jilin in the northeastern part of China, and later in the river Amur. As a result of this accident, water intake for the needs of Harbin was stopped for 4 days.⁶

Professor of the Institute of Water and Environmental Problems of the Far Eastern Branch of the Russian Academy of Sciences (Khabarovsk) L. Kondratyeva immediately emphasized that the environmental consequences of a man-made accident in Heilongjiang Province cannot be expressed in monetary terms, since there is no price for biological diversity that ensures the stability of ecosystem functioning. The consequences of a technogenic accident in the Songhua River basin should be classified as a potential environmental risk, when a negative effect can be expected after a long time and at a great distance from the source of pollution.⁷

At the same time, the availability of statistical data indicating a decrease in the number of identified environmental crimes since 2010 cannot unconditionally indicate the normalization of the environmental situation in the country.

So, if from 2000 to 2009 there was an increase in the crimes under consideration by an average of 302% (from 14,818 to 46,607), then in 2010 a decrease in the number of committed environmental crimes was recorded, which continues to this day (from 39,155 to 22,230): in 2010, 39,155 crimes in the field of environmental safety were registered; in 2011 - 29,151; in 2012 - 27,583; in 2013 - 24,728; in 2014 - 25,566; in 2015 - 24,856; in 2016 - 23,688; in 2017 - 24,379; in 2018 - 23,899; 2020 - 22,700 (a slight increase of 2%), in 2021 - 20289, in 2022 - 19,070.⁸

According to experts, this is not due to a cardinal improvement in the environmental situation, a decrease in the intensity of impact on the natural environment

⁵ See: Statistical data of the Information Center of the Main Directorate of the Ministry of Internal Affairs of Russia for the Nizhny Novgorod Region 2019 – 2022.

⁶ See: Li Yanyan, article “The system of fines and compensation for environmental offenses”// Lex russica. 2014. N 1. P. 67 - 77, SPS “Consultant Plus”.

⁷ See: Simonov E.V. Cupid is in danger. // <http://www.wwf.ru/resources/news/article/2086>. – 2005

⁸ See: <https://mvd.rf/folder/101762>, <https://mvd.rf/reports/item/22678184/>.

or a “real” reduction in environmental offenses, but primarily to a change in environmental standards that delimit legal actions from criminal impacts on nature.

This issue was described in detail by I.P. He rightly noted that “practically every change increased the MAC, there were cases of a decrease in the hazard class, and many data on the reduction of pollution in Russia are associated not with real changes, but with changes in MAC values.”⁹

The following example will clearly demonstrate this.

Decree of the Chief State Sanitary Doctor of the Russian Federation dated June 17, 2014 No. 37 amended GN 2.1.6.1338-03 “Maximum Allowable Concentrations (MAC) of pollutants in the atmospheric air of populated areas”, which increased the average daily maximum permissible concentrations for formaldehyde by 3.3 times (from 0.003 to 0.01 mg/m³), and one-time - 2.4 times (from 0.035 to 0.05 mg/m³).

In the future, these changes were consolidated in the resolution of the Chief State Sanitary Doctor of the Russian Federation dated January 28, 2021 No. 2

“On approval of sanitary rules and norms SanPiN 1.2.3685-21 “Hygienic standards and requirements for ensuring the safety and (or) harmlessness of environmental factors for humans”. The situation is similar with changes in MAC of phenol.

With such changes in legislation, the reasons for the absence (small number) of criminal cases on the grounds of crimes provided for

Article 251 of the Criminal Code of the Russian Federation.

Such an approach cannot ensure the adoption of agreed legal acts, standards, environmental regulations that ensure environmental safety and only leads to an increase in the size of the negative impact on the environment.

Currently, the country’s environmental security is considered at the state level as an integral part of national security and is singled out as one of the priorities of our time. It can already be said that this institution is firmly entrenched in our legal system, however, despite its global significance, it has not yet fully acquired “citizenship rights” in our scientific and educational literature, curricula and courses. So far, the legislator has not developed the concept of “security”.

Also, environmental safety is not yet sufficiently integrated with the economy, law enforcement, state and municipal activities. Until now, there is no consensus on its very understanding and the need for special legal regulation of this range of social relations.¹⁰

⁹ See: Monographs by I.P. Blokov “Environment and its protection in Russia. Changes in 25 years”, <https://greenpeace.ru/wp-content/uploads/2018/11/blokov.pdf>, pp. 76-78.

¹⁰ See: Zhavoronkova N.G., Agafonov V.B. Theoretical and methodological problems of legal support of ecological, biospheric and genetic security in the national security system of the Russian Federation // Lex russica. 2019. N 9. P. 96 - 108. SPS “Consultant Plus”.

In our opinion, environmental safety is a generic concept that covers all its varieties. In turn, it is one of the types of security in general, along with military, food, fire, etc. It can be defined as the state of protection of a person, society, the state and the natural environment from negative natural and man-made impacts, as well as the consequences of such an impact, which makes it possible to preserve the habitual habitat, provided by organizational, legal, economic, scientific, technical and other means.

Such a definition of “environmental security” will allow harmoniously integrating and developing such topical areas of security as genetic, biospheric, evolutionary, etc.

One of the basic principles of environmental safety is the presumption of environmental danger arising from any production and economic activity.

and other activities. This means that the burden of proving the environmental safety of such activities lies with the subject of this activity. Such a “hard” approach to the regulation of production, economic and other activities, is reflected and normatively fixed in Article 3 of the Federal Law “On Environmental Expertise”. However, the legislator deliberately goes for it, setting the priority of environmental safety, which is one of the manifestations of concern and concern for the state of the natural environment and the need to ensure its healthy and favorable condition for a person and society.

Here it should be noted the “duality”, which is typical for citizens, their associations and the state in determining the object and subject of environmental safety. In this regard, N.N. Vedenin noted that the objects of environmental safety are: a person, his associations, society and the state as a whole, the environment and its components - individual natural objects, ecosystems, specially protected areas.¹¹

It is quite clear that citizens, public organizations and associations, the state as a whole are at the same time the most important subjects of legal relations in the field of ensuring environmental safety, endowed with certain rights and obligations.¹² For example, in the Law of the Russian Federation “On the Protection of the Environment” (hereinafter - the Law), an independent article 11 in Chapter 3 of the Law is devoted to the rights of citizens to a healthy and favorable natural environment, and other articles of Chapter 3 of the Law refer to the rights and obligations of the relevant state and public bodies in the field of environmental protection.¹³

¹¹See: Vedenin N.N. Animal world: problems of protection and use // Journal of Russian law, 2002. - No. 12.P.14.

¹² See: Vedenin N.N. “Environmental safety as an institution of environmental law” // Journal of Russian law. - M. - 2001. - N 12. - P.5-6. 13

¹³ See: Federal Law “On Environmental Protection” dated January 10, 2002. N7-FZ // SPS “Consultant plus”.See: Federal Law “On Environmental Protection” dated January 10, 2002. N7-FZ // SPS “Consultant plus”.

I also note the absence of a fundamental legislative act, which could be the federal law “On Environmental Safety”. The need to adopt such a legislative act was recognized as early as the mid-1990s. There were also practical developments, including in legislative activity. Thus, in 1995, the State Duma of the Federal Assembly of the Russian Federation adopted and sent to the Federation Council of the Federal Assembly of the Russian Federation a draft of the relevant normative act. However, for a number of reasons it was not signed and made public by the head of state. Since then, work on this legislation has stalled.

It should be noted here that back in 2003, at the 22nd plenary meeting of the Interparliamentary Assembly of the CIS Member States, the “Model Law on Environmental Security” was adopted, the provisions of which were not properly developed in the national legislation of our country.¹⁴

Meanwhile, without such a federal law it is hardly possible to achieve the necessary integrity, consistency and lack of gaps in the legal regulation of this extremely important sphere of social relations.

In my opinion, this normative act could reflect the following provisions:

- basic principles for ensuring environmental safety guarantees;
- basics of state environmental safety management; powers of central government bodies in the sphere of relations related with the management of the environmental safety of the state;
- the powers of the central state executive authorities in the sphere of relations related to ensuring the guarantees of the state’s environmental safety;
- the rights and obligations of citizens, public organizations, movements, political parties and other non-profit associations to ensure the guarantees of the environmental safety of the state;
- the rights and obligations of citizens in the field of ensuring guarantees of environmental safety;
- upbringing, education and enlightenment in the field of environmental safety;
- the need to introduce environmental insurance, when an enterprise that allowed this situation is responsible for an environmental catastrophe in the region, etc.

By the way, the latest attempts to make environmental insurance mandatory were made after the dam broke on the Seiba River in the Krasnoyarsk Territory in October 2019 and the disaster with the spill of 21 thousand tons of diesel fuel at a thermal power plant owned by the Norilsk-Taimyr Energy Company in May 2020, the damage from which was estimated 2 billion dollars.

This law must be adopted in order to clearly define which state body is responsible for the state of environmental safety.

¹⁴ See: SPS “Consultant Plus”, Information Bulletin, Inter-Parliamentary Assembly of the Member States of the Commonwealth of Independent States, 2004. No. 33, pp. 291 – 329.

and determine his responsibility. The law should become a single legislative act, the main tasks of which are to generalize and systematize the entire legal framework, raise the status of environmental requirements and regulations to the level of a direct action legislative act, and introduce international standards into environmental protection practice.

When building it, the priority, in addition to penalties, should come with effective economic leverage, prevention of environmental offenses, and stimulation of the introduction of new technologies.

In all developed countries of the world, there is a fairly strict environmental control, users of natural resources are open to inspections, and there is a priority of administrative methods of regulation over economic ones. This balance of interests should be clearly spelled out in this law.

Environmental law should not be placed between the hammer and the anvil of private and public interests, serve as a tool for ensuring economic dominance, or be used in the interests of political expediency.

DOI 10.34660/INF.2023.56.23.090

数字卢布作为民法关系客体的法律资格问题：私人 and 公共法律规制的比例
**PROBLEMS OF LEGAL QUALIFICATION OF THE DIGITAL
RUBLE AS AN OBJECT OF CIVIL LAW RELATIONS: THE RATIO
OF THE PRIVATE AND PUBLIC LEGAL REGULATION**

Svarchewsky Konstantin Gennadevich

*Candidate of Juridical Sciences, Associate Professor, Head of
Department*

The North-Western branch

Russian State University of Justice, Saint-Petersburg, Russia

Sachenko Alexei Leonidovich

Candidate of Juridical Sciences, Associate Professor

The North-Western branch

Russian State University of Justice, Saint-Petersburg, Russia

注解。 本文考虑了作为民事法律关系客体的数字卢布法律制度的现代问题。通过对现行法律行为的分析，论证了从私法和公法立法的角度对数字卢布作为法律规制对象的模糊理解。为了解决数字卢布制度可能存在的法律资格问题，提出了对货币（包括数字货币）作为公民权利的独立客体的认识。

关键词：数字卢布、公民权利客体、货币、金钱、事物、财产、数字权利。

Annotation. *In this article the modern problems of the legal regime of the digital ruble as an object of civil legal relations are considered. Based on the analysis of the current legal acts, the ambiguous approach to the understanding of the digital ruble as an object of legal regulation from the position of private-law and public-law legislation is demonstrated. For the purpose of remediation of possible problems of legal qualification of the digital ruble regime, the perception of money, including digital money as an independent object of civil rights is offered.*

Keywords: *digital ruble, object of civil rights, currency, money, thing, property, digital rights.*

Modern civil law turnover has clearly demonstrated the need for the development of established payment systems from both the technical, organisational, financial and legal sides. The development of the digital economy of the Russian Federation and its further integration into the world economy certainly reflects

both general needs and global processes associated with the world digitalisation of most spheres of social life. In connection with the above-mentioned factors of great importance are the issues of legal qualification of relations developing in the digital environment, especially in the system of private-law relations, in which the national currency acts as a means of payment. So one of the factors of this phenomenon is the gradual entry of such a category as “digital ruble” into the system of civil-law relations. And although the analysis of these relations claims a significant number of studies, both sectoral and inter-branch, it seems that the identification of the peculiarities of the civil legal regime of the digital ruble is of basic importance for the proper legal qualification of both law enforcement agencies and various public organisations representing the interests of entrepreneurs.

From the position of characterisation of objects of civil rights, money is not singled out as their independent variety provided for by Article 128 CC of RF. On the one hand, this does not cause any serious problems from the point of view of perception of money based on their traditional differentiation into cash and non-cash, but on the other hand, the inclusion of the digital ruble as an object of civil rights raises a whole set of issues that need to be resolved by the legislator.

Thus, according to the content of Article 128 of the CC of RF, cash money in its legal regime is equated with things, and non-cash money is identified by the legislator with property. Without going into details of the reasons for the legal regulation of attributing the two forms of money to different, in fact, types of objects of civil rights, it is worth mentioning separately in this context the position of the digital ruble. According to the information published on the CB of RF portal «digital ruble» is a digital form of the Russian national currency, which the Bank of Russia plans to issue in addition to existing forms of money” [1]. At the same time CB of RF acting as a financial market regulator considers the digital ruble as a separate (digital) form of national currency, which is also reflected on the official portal of CB of RF [2] “The digital ruble is the third form of the ruble. Now we have cash (banknotes and coins in our wallets) and non-cash (money in bank accounts, on cards), and in addition to them there will be a third form - digital”-this information explains the understanding of the digital ruble to all interested parties.

At first glance, this state of affairs is quite understandable from the position that according to Article 141.1 of the CC of RF digital rights are recognised as obligatory and other rights named as such in the law, the content and conditions for the exercise of which are determined in accordance with the rules of the information system that meets the features established by law. In this regard, an intermediate conclusion should be made that the legalisation of such an object of civil rights as a digital rouble gives rise to digital rights in respect of it. However, the very formulation of the content of digital rights also leaves a number of questions. In particular, it is worth noting that by specifying rights of obligation as a

type of digital right, the legislator broadly interprets the content of digital rights, implying that they may also include other rights. It is quite logical that other rights arising in relation to a digital rouble may also be rights in rem. At least, there are no restrictions on this matter in civil legislation today. And this conclusion seems quite logical in correlation with the content of Article 128 CC of RF, which in turn considers cash money as things, and non-cash money as property. The logical chain of this phenomenon is organically intertwined with the fact that, according to the official information of the CB of RF contained in the Concept of the Digital Ruble, the digital rouble is an obligation of the Bank of Russia [3]. In this regard, the concept of “digital rouble-digital right-obligation” confirms its existence. Thus, the boundary between the traditional understanding of cash and non-cash money through the prism of property-law relations from the point of view of the meaning of the current civil legislation and digital money itself, a type of which is the digital rouble, is clearly delineated.

However, this concept cannot be realised either practically or theoretically, precisely because of the incompleteness of the process of regulation of the digital rouble by civil legislation. This is evidenced, in particular, by the fact that according to the Draft No. 270852-8 of the Federal Law “On Amendments to Articles 128 and 140 of Part One, Part Two and Articles 1128 and 1174 of Part Three of the Civil Code of the Russian Federation” non-cash funds are supplemented with the wording “including digital roubles”. In this regard, from the position of private law regulation of the digital rouble regime, extremely ambiguous phenomena are evident, which create problems at the stage of legal understanding of the legal position of the digital rouble as a type of non-cash money. In our opinion, this is, in particular, an extremely unfortunate legal construction that allows identifying the digital rouble with non-cash funds. This position, despite the fact that it is still a draft law, significantly narrows the potential of the digital rouble turnover. Thus, the digital rouble is still a means of payment, placed in the form of a unique digital code on an electronic wallet [4]. This fact alone distinguishes the use of the digital rouble in comparison with non-cash funds, for which the presence of such an attribute as an electronic wallet is not necessary at all. Moreover, such an approach goes beyond the civil law regulation of the digital rouble in the context of the legislation on national currency. So, in particular, according to the provisions of Art. 1 of the Federal Law of 10.12.2003 № 173-FL (ed. of 31.07.2020) “On currency regulation and currency control” [5] the currency of the Russian Federation is recognised as the currency of the Russian Federation [5] the currency of the Russian Federation is recognised as: money signs in the form of banknotes and coins of the Bank of Russia, in circulation as a legal means of cash payment in the territory of the Russian Federation, as well as withdrawn or withdrawn from circulation, but subject to exchange of these money signs, as well as funds in bank accounts and bank

deposits. Thus, the currency legislation, which does not accept the digital ruble as a legal means of payment in the territory of the Russian Federation, also needs substantial improvement. Its place among non-cash and (or) special digital monetary forms remains open. At the same time, it should be noted that the Supreme Court of the Russian Federation, the highest judicial body of the Russian Federation, adheres to a traditional and even conservative view. So, for example, according to the content of the Decree of the Supreme Court of the Russian Federation of 04.09.2015 N 302-AD15-7697 in case No. A74-6846/2014 [6] the currency of the Russian Federation is recognised as currency of the Russian Federation in the form of banknotes and coins of the Bank of Russia, which are in circulation as a legal means of cash payment on the territory of the Russian Federation. Although at the same time we cannot bypass the Decision of the Ninth Arbitration Appeal Court of 15.05.2018 N 09AP-16416/2018 in the case N A40-124668/2017, which states that cryptocurrency cannot be regarded in relation to Art. 128 CC of RF otherwise as other property. In a fundamentally general approach to the issue of qualification of the legal regime of the digital ruble in the context under consideration, it appears that the broad application of analogy of law by judicial authorities for the purpose of correct and timely consideration and resolution of the case is quite permissible. However, the question of ownership of the digital ruble, which, by the way, is not a cryptocurrency in the generally accepted meaning [7] remains open, because as stated above, the position that the digital ruble can be equated with other types of property contradicts the position of the CB of RF as a regulator of the financial services market, that is, it contradicts the public law principles that determine the legal regime of the digital ruble.

Thus, when determining the civil legal regime of the digital ruble, it is worth noting significant contradictions between public-law principles and private-law bases of regulation of such objects as monetary funds.

As one of the ways to overcome these contradictions, it seems positive to recommend a return to the more usual classification of objects of civil rights, in which monetary funds are named as an independent object, without taking into account their perception neither as things nor as property. A more detailed approach to the differentiation of forms of money as an independent type of objects of civil rights will allow levelling the problems of law enforcement of individual norms of both civil and currency legislation, as well as a more meaningful perception of digital relations in general from the point of view of theoretical and scientific approaches.

References

1. <https://cbr.ru/fintech/dr/ as of 10/06/2023>
2. <https://cbr.ru/fintech/dr/ as of 10/06/2023>
3. https://cbr.ru/Content/Document/File/120075/concept_08042021.pdf
4. 4 <https://journal.tinkoff.ru/guide/digital-currency/>
5. Federal Law of 10.12.2003 № 173-FL (ed. of 05/12/2022) “On currency regulation and currency control” (with amendments and additions, effective from 01/01/2024) //Collection of Legislation of the Russian Federation, 15.12.2003, № 50, Art. 4859,
6. <https://base.garant.ru/71186610/?ysclid=ljx61w1nq3808725314>
7. How a digital rouble differs from a cryptocurrency: <https://cbr.ru/fintech/dr/>

关于界定酒精及含酒精产品技术损失概念的必要性

**ON THE NEED TO DEFINE THE CONCEPT OF TECHNOLOGICAL
LOSS FOR ALCOHOL AND ALCOHOL-CONTAINING PRODUCTS**

Chernyakova Elena Evgenievna

*Senior Researcher, Acting Head of the Laboratory
Russian Presidential Academy of National Economy and
Public Administration*

Bogatyreva Anna Fedorovna

*Research Officer
Russian Presidential Academy of National Economy and
Public Administration*

Yastrebova Ekaterina Alexandrovna

*Research Officer
Russian Presidential Academy of National Economy and
Public Administration*

注解。俄罗斯税法规定可以减少所得税的税基，并在一定的既定价值范围内获得消费税减免。纳税人有权将产品生产过程中发生的任何损失（包括全部自然损失）排除在所得税的计税基础之外，但仅限于规定的标准范围内。对于酒精和含酒精产品，没有技术损失（损失）标准。在获得消费税减税的可能性方面也出现了类似的情况。与此同时，对于其他应税商品，立法规定了在类似基础上减少税基的可能性。因此，在计算扣除用于生产石化产品的直馏汽油时所计算的消费税额时，还考虑了技术损失。我们还注意到区分自然损失和技术损失造成的损失很困难。

关键词：企业所得税、酒精及含酒精产品消费税、技术损失、自然损失。

Annotation. *Russian tax legislation provides for the possibility of reducing the tax base for income tax, as well as receiving tax deductions for excises within certain established values. The taxpayer has the right to exclude from the taxable base for income tax any losses incurred in the process of production of products, including in their totality with natural loss, but only within the established norms. There are no standards for technological loss (losses) in the case of alcoholic and alcohol-containing products. A similar situation has developed in terms of the possibility of obtaining a tax deduction for excises. At the same time, for other excisable goods, the legislation provides for the possibility of reducing the tax*

base on a similar basis. So, when calculating the deduction of excise amounts calculated upon receipt (acquisition of property) of straight-run gasoline used for the production of petrochemical products, technological losses are also taken into account. We also note the difficulty of distinguishing between losses arising as a result of natural loss from technological losses.

Keywords: *corporate income tax, excise tax on alcoholic and alcohol-containing products, technological losses, natural loss.*

The process of production of alcoholic products in itself is not unique in terms of the fact that, like any other product, alcohol and alcohol-containing products are subject to natural loss due to a regular change in their properties as a result of expiration dates, changes in storage conditions, etc. Tax legislation takes into account these properties of products, providing for the possibility of reducing the tax base for income tax, as well as receiving tax deductions for excise amounts within the established values. However, the legislation does not contain any standards for technological loss, therefore, in this area the conceptual apparatus has not been developed, there is a certain legislative gap.

In accordance with Article 204 of the Tax Code of the Russian Federation, the taxpayer has the right to exclude from the taxable base any losses that have arisen in the production process, including in their totality with natural loss, but only within the established norms. To date, the Ministry of Finance of Russia has determined only the norms of attrition (Order of the Ministry of Finance of Russia dated December 14, 2021 N 211n “On approval of the norms of attrition in the production and circulation (excluding retail sales) of ethyl alcohol, alcoholic and alcohol-containing products”). This order establishes the following norms of natural attrition:

- norms of natural loss during the purchase, storage and supply of ethyl alcohol;
- norms of natural loss in the production of alcoholic products (with the exception of wine products, beer and beer drinks);
- norms of natural loss in the production and turnover (excluding retail sales) of wine products, as well as calvados distillate;
- norms of natural loss in the production and circulation of alcohol-containing products;
- norms of natural loss in the production of beer and beer drinks;
- attrition rates in the production of cider, poiret and mead.

There are also standards for losses in the production of alcohol and alcoholic products, given in the Collection of standards for alcohol and distilleries insurance supervision (IS) 10-12446-99, approved by the Ministry of Agriculture and Food of Russia on November 24, 1999, but they are limiting and are applied only in

cases of actual shortages. Write-off of alcohol according to the standards until the actual losses are established is not allowed. Thus, taxpayers are deprived of the opportunity to reduce the taxable base, taking into account technological losses that appear during production. This problem is confirmed in judicial practice. So, for example, the company “Omskvinprom” reduced the amount of excise tax on technological losses in excess of the norms of natural attrition established by order of the Ministry of Agriculture of the Russian Federation dated 06.26. anhydrous alcohol transferred to the laboratory. The tax authority brought the company to tax liability and charged additional excise duty. The courts upheld the position of the tax authority, pointing out that the tax legislation does contain the term “technological losses”, but it does not apply to alcohol and alcoholic products (Resolution of the Arbitration Court of the West Siberian District of August 9, 2021 in case N A46-16613 / 2020, in this case, the Supreme Court of the Russian Federation, by a ruling dated 01.12.2021, refused to transfer the cassation appeal for consideration by the Judicial Collegium of the Supreme Court of the Russian Federation ¹).

It should be noted that regarding the excise taxation of finished alcoholic products transferred to the laboratory, there are clarifications from the Federal Tax Service of Russia, indicated in the letter dated April 15, 2019 No., loss, laboratory research, advertising”, from which it follows that by virtue of the PDP. 1 p. 1 Article 182 of the Tax Code of the Russian Federation, for the purposes of Chapter 22 “Excises” of the Tax Code of the Russian Federation, the transfer of ownership of excisable goods by one person to another person on a reimbursable and (or) gratuitous basis, as well as their use for payment in kind, is recognized as the sale of excisable goods. According to entrepreneurial activity. 9 p. 1 Article 182 of the Tax Code of the Russian Federation, the transfer on the territory of the Russian Federation of excisable goods produced by them for their own needs is recognized as an object of taxation. However, when the producer of alcoholic products transfers to the laboratory for research of such products, the ownership right to it does not transfer, and this alcoholic product is not used for the manufacturer’s own needs. Thus, it seems that the volumes of alcoholic products transferred by the manufacturer to the laboratory for product research within the limits established by the regulatory and technical documentation (EASC, OST, Product Specification) are not subject to excise taxation (this position is confirmed by a letter from the Ministry of Finance of the Russian Federation dated February 20, 2008 N 03-07-06/13).

The Federal Tax Service of Russia outlined a similar conclusion in a letter dated February 15, 2021 N SD-4-3 / 1884@ “On excises”. The tax authority was asked for clarification on the issue of obtaining a tax deduction for the amounts of excise paid and attributable to the volume of losses of ethyl alcohol within the lim-

¹ <https://kad.arbitr.ru/Card/1a224df7-3e62-42ce-870d-59fd70ef1975>

its of natural wastage. The regulator decided that the amount of excise tax related to the part of ethyl alcohol irretrievably lost in the process of production, storage, movement and subsequent technological processing within the limits of natural wastage approved by the authorized federal executive body for the relevant group of goods is not subject to deduction, since it is not provided for in paragraph 11 of Article 200 of the Tax Code of the Russian Federation.

Along with the above negative judicial practice, it is interesting that there is an opposite example, namely, the recognition of technological losses in the payment of excise duty by producers of beer products. In the practice of the auditing company Finance Group, a description of a case was found when, at the pre-trial stage, the taxpayer managed to prove that technological losses arising in the production of beer are inevitable, while only sold products are subject to taxation. The tax authority found discrepancies in meter readings at the stage of bottling products and the stage of labeling and considered this to be a shortage in excess of the norms of natural loss, in accordance with paragraph 4 of Article 195 of the Tax Code of the Russian Federation. After clarifications from Rosalkogolregulirovanie that technological losses are not subject to excise taxation, the tax authority refused its requirements². By observations authors Articles , many similar disputes allowed on pre-trial stages , therefore , despite on minimum quantity relevant judicial practices , we do conclusion O importance attract attention To question conceptual apparatus And developing special regulation By given question For industries production alcohol-containing products .

At the same time, in relation to other excisable goods, the legislation provides for the possibility of reducing the tax base on a similar basis. When calculating the deduction of excise amounts calculated upon receipt (acquisition of ownership) of straight-run gasoline used for the production of petrochemical products, technological losses are also taken into account. According to paragraph 15 of Article 200 of the Tax Code of the Russian Federation, excise amounts accrued when performing a transaction to obtain (acquire property) straight-run gasoline, when it is used for the production of straight-run gasoline, benzene, paraxylene, orthoxylene, including technological losses arising in the process of such production or for the production of petrochemical products, including technological losses arising in the course of such production are deductible. In accordance with paragraph 7 of Article 254 of the Tax Code of the Russian Federation, technological losses are recognized as losses during the production and (or) transportation of goods (works, services) due to the technological features of the production cycle and (or) the transportation process, as well as the physicochemical characteristics of the raw materials used.

² <https://profibeer.ru/law/kejs-kak-osporit-u-nalogovoj-8-mln-rublej-akcziza-za-technologicheskie-poteri/>

The difficulty in determining a criterion that makes it possible to unambiguously distinguish between losses arising as a result of natural loss from technological losses, as well as, in principle, the lack of development of the conceptual apparatus in this area, is noted in his Article by Shcherbak E.R., analyzing the Order of the Ministry of Economic Development of the Russian Federation of March 31, 2003 N 95 On approval of the Guidelines for the development of norms of natural attrition”. The author notes that this Order mentions expenses that are not related to natural wastage, therefore, if during the audit the tax authority reveals that product losses declared as natural wastage, in fact, they are not (except for technological losses), that is reason to believe that the excise tax will be additionally assessed, together with penalties and fines. At the same time, the Ministry of Economic Development, albeit in a recommendatory form, notes that technological losses should not be attributed to natural loss.

Of particular interest are also the remarks of Shcherbak E.R., made on the basis of studying the Letter of the Ministry of Finance of Russia dated February 16, 2017 N 03-03-06/1/8847 “On accounting for technological losses in production (transportation) for income tax purposes” and Letters of the Ministry of Finance of Russia dated 08.20.2018 N 03-03-06/1/58833 “On accounting for profit tax purposes of technological losses”. The author is critical of the fact that, in fact, the legislator left the taxpayer to independently regulate what exactly should be attributed to technological losses ³, without establishing clear criteria for each of the categories of losses in the course of production.

Excises on alcoholic and alcohol-containing products, being an important indirect tax, play an important role in the formation of tax revenues of the budget system of the Russian Federation and provide revenues to the consolidated budget. At the same time, for example, excise taxes on alcohol are, in principle, one of the lowest collected taxes on the territory of the Russian Federation ⁴. The reason for this is, among other things, the peculiarity of alcohol as a product with low elasticity of demand, an increase in the price of which has little effect on demand. Let us point out that the program document “The Concept for the Implementation of the State Policy on Reducing the Scale of Abuse of Alcoholic Products and Preventing Alcoholism among the Population of the Russian Federation for the period up to 2020 (approved by Decree of the Government of the Russian Federation of December 30, 2009 No. 2128-r) was previously in force, establishing general principles price policy for alcoholic products, but does not disclose in detail the excise policy of the state. A new policy document in this area has not yet been prepared.

³ Shcherbak E.R. Natural decline as a basis for the deduction of excises on alcoholic products: shortcomings of the conceptual apparatus of tax legislation // The Scientific Heritage. 2020. No. 45-4 (45).

⁴ Kalabin K.Yu. Improving the institutional model of the Russian system of excise taxation // Finance. Taxation. Credit. №3, 2022

At the same time, it should be noted that viticulture and winemaking are supported at the state level within the framework of the federal project “Stimulation of the development of viticulture and winemaking”. On December 4, 2021, the Government of the Russian Federation approved the rules for subsidizing this economic sector in order to reduce the share of imported wine materials in Russia. We believe that any changes in the excise policy of the Russian Federation in relation to alcoholic products should be consistent with the goals of the federal project. Summing up the above, we believe that, indeed, the issues of separating the concepts of natural loss and technological losses should be identified at the level of federal legislation, and not the regulatory legal acts of executive authorities.

References

1. <https://kad.arbitr.ru/Card/1a224df7-3e62-42ce-870d-59fd70ef1975>
2. <https://profibeer.ru/law/kejs-kak-osporit-u-nalogovoj-8-mln-rublej-akcziza-za-technologicheskie-poteri/>
3. Shcherbak E.R. *Natural decline as a basis for the deduction of excises on alcoholic products: shortcomings of the conceptual apparatus of tax legislation // The Scientific Heritage. 2020. No. 45-4 (45).*
4. Kalabin K.Yu. *Improving the institutional model of the Russian system of excise taxation // Finance. Taxation. Credit. №3, 2022*

将无人驾驶民用飞机纳入俄罗斯领空：选定的法律问题
**INTEGRATION OF UNMANNED CIVIL AIRCRAFT INTO THE
AIRSPACE OF THE RUSSIAN: SELECTED LEGAL ISSUES**

Eyrian Gulnur Nikolaevna

*Candidate of Juridical Sciences, Associate Professor
Perm State National Research University*

抽象的。21世纪的一个显著特征是无人机大规模进入社会民用领域。将无人驾驶民用飞机纳入任何国家的单一空域都会涉及大量不同性质的问题，包括法律问题。目前，俄罗斯联邦有关民用无人机使用的立法正处于初步形成阶段。它的规定并不多，涵盖的问题范围也很小。文章结合全球趋势，阐述了俄罗斯有关该主题的立法现状及其发展前景。

关键词：无人驾驶民用飞机、空域、俄罗斯联邦空域的使用。

Abstract. *A striking, distinctive feature of the 21st century has been the large-scale introduction of unmanned aircraft into the civil sphere of society. The integration of unmanned civil aircraft into the single airspace of any state is associated with a large number of problems of a different nature, including legal ones. Currently, the legislation of the Russian Federation regarding the use of unmanned civil aircraft is at the initial stage of formation. Its provisions are not numerous, covering a small range of issues. The article canalizes both the current state of Russian legislation on the stated topic, and the prospects for its development, taking into account global trends.*

Keywords: *unmanned civil aircraft, airspace, the use of the airspace of the Russian Federation.*

Decree of the Government of the Russian Federation No. 1630-r dated June 21, 2023 approved the Strategy for the Development of Unmanned Aviation in the Russian Federation for the period up to 2030 and for the future up to 2035 and an action plan for its implementation (hereinafter referred to as the Strategy), as well as an action plan for its implementation¹. The strategy is an industry-specific

¹ Decree of the Government of the Russian Federation dated June 21, 2023 No. 1630-r "On approval of the Strategy for the development of unmanned aircraft in the Russian Federation for the period up to 2030 and for the future up to 2035 and an action plan for its implementation. URL: <http://publication.pravo.gov.ru/document/0001202306280006> (date of access: 07/03/2023).

strategic planning document that determines the development and formation of a promising image of unmanned aircraft for the specified periods, including in the interests of developing high-tech sectors of the economy and improving unmanned aerial systems as a product, ensuring the technological sovereignty of the Russian Federation, expanding infrastructure for the safe use of unmanned aerial systems and capacity building of the unmanned aviation industry.

According to the data provided in the Strategy, services using unmanned aerial systems are used in a wide range of sectors of the Russian economy (geological exploration and mining, construction, agriculture and forestry, fuel and energy complex and entertainment). The most popular types of services using unmanned aerial systems in 2022 were the monitoring of oil and gas pipelines, power grids (about 40 percent), aviation chemical work in agriculture (about 20 percent), light shows (about 12 percent), work for forest management (about 7 percent), inspection of capital construction projects (about 7 percent), transportation of goods (about 6 percent), cartography and cadastre (about 5 percent), and aeromagnetic survey (about 3 percent).

It seems that the scope of unmanned aerial systems will only increase, since “the extent of their potential application at the national level depends only on human ingenuity”².

In addition to addressing issues related to technological, scientific, personnel and production support for the development of unmanned aircraft, the task of the near future will be the development of legal regulation of the use of unmanned civil aircraft (hereinafter also referred to as unmanned aerial vehicle, drone)³. As noted in the literature, “in the 21st century, the paradigm of unmanned technologies has changed from military operations to civilian ones⁴.” The use of unmanned civil aircraft is associated, first of all, with their integration into the single airspace of a certain state, in respect of which it has full and exclusive sovereignty. In the Russian Federation, this task is solved within the framework of state regulation of the use of the airspace of the Russian Federation and activities in the field of aviation. The Air Code of the Russian Federation, the Federal Rules for the Use of the Airspace of the Russian Federation⁵ should be included among the main regu-

² Dolan A., M. Thompson R. M., II. Integration of Drones into Domestic Airspace: Selected Legal Issues. URL: <https://sgp.fas.org/crs/natsec/R42940.pdf> (accessed 03.07.2023).

³ In accordance with paragraphs. 2.1 p. 1 art. 8 of the Air Code of the Russian Federation, an unmanned civil aircraft is an element of an unmanned aerial system.

⁴ AIP Conference Proceedings 2172, 080012 (2019); <https://doi.org/10.1063/1.5133570>. Published Online: November 13, 2019.

⁵ Decree of the Government of the Russian Federation of March 11, 2010 No. 138 (as amended on December 2, 2020) «On Approval of the Federal Rules for the Use of the Airspace of the Russian Federation» (as amended and supplemented, effective from June 9, 2021) // Collected Legislation of the Russian Federation. 2010. No. 14. Art. 1649.

latory acts ⁶. Of great importance in the context of the issues under consideration are also the Concept for the Integration of Unmanned Aircraft into the Common Airspace of the Russian Federation and the plan for its implementation ⁷.

An analysis of the current legislation of the Russian Federation on the use of unmanned civil aircraft shows that it is in the initial stage of formation. Currently, a small number of issues can be attributed to the number of settled issues. In particular, Art. 33 of the Air Code of the Russian Federation regulates relations for state registration and state registration of aircraft. Unmanned aerial vehicles, with the exception of unmanned civil aircraft with a maximum takeoff weight of 30 kilograms or less, are subject to state registration ⁸. Unmanned civil aircraft with a maximum takeoff weight of 0.15 kilograms to 30 kilograms imported into the Russian Federation or manufactured in the Russian Federation are subject to state registration in the manner established by the Government of the Russian Federation ⁹.

Clause 52 of the Federal Rules for the Use of the Airspace of the Russian Federation establishes a general rule on the use of airspace by an unmanned aircraft on the basis of an aircraft flight plan and permission to use the airspace. This rule, with some exceptions, does not apply in the case of visual flights of unmanned aerial vehicles with a maximum take-off weight of up to 30 kg, carried out within the line of sight during daylight hours at altitudes of less than 150 meters from the earth or water surface (paragraph 52(1) of the above Rules).

From March 1, 2024, amendments to the Federal Rules for the Use of the Airspace of the Russian Federation come into force¹⁰, which simplify the procedure for using unmanned civil aircraft. According to the updated rules, it is allowed to launch drones over populated areas at a height of up to 150 meters from the ground or a body of water during daylight hours. In this case, the drone must be in direct line of sight of the remote pilot and outside the restricted areas ¹¹.

⁶ Air Code of the Russian Federation of March 19, 1997 No. 60-FZ (as amended on June 13, 2023) // Collection of Legislation of the Russian Federation. 1997. No. 12. Art. 1383.

⁷ Decree of the Government of the Russian Federation of 05.10.2021 No. 2806-r (as amended on 05.12.2022) "On approval of the Concept for the integration of unmanned aircraft into the single airspace of the Russian Federation and the implementation plan for the Concept in terms of technology development" // Collected Legislation of the Russian Federation. 2021. No. 42. Art. 7159.

⁸ Order of the Ministry of Transport of Russia dated January 18, 2023 No. 11 "On Approval of the Rules for the State Registration of Civil Aircraft in the Russian Federation". URL: <http://pravo.gov.ru>. 06/02/2023.

⁹ Decree of the Government of the Russian Federation of May 25, 2019 No. 658 (as amended on August 12, 2022) "On Approval of the Rules for State Registration of Unmanned Civil Aircraft with a Maximum Takeoff Weight of 0.15 kg to 30 kg Imported into the Russian Federation or Produced in the Russian Federation". URL: <http://www.pravo.gov.ru>, 05/30/2019.

¹⁰ Decree of the Government of the Russian Federation of June 21, 2023 No. 1016 "On Amending the Federal Rules for the Use of the Airspace of the Russian Federation and Recognizing Certain Provisions of Decree of the Government of the Russian Federation of February 3, 2020 No. 74 as invalid". URL: <http://pravo.gov.ru>, 06/28/2023.

¹¹ <https://mintrans.gov.ru/press-center/news/10765>

In accordance with paragraphs. 52(3), 52(4) of the Federal Rules for the Use of the Airspace of the Russian Federation in a new edition, an unmanned aircraft flight zone should be established, which means a part of the airspace above a populated area intended for flights of unmanned aircraft at altitudes of less than 150 meters from land or water surface in order to meet the needs of citizens, public, sports and (or) educational organizations. It follows from the content of these norms that the simplification of the procedure for the use of unmanned civil aircraft applies only to their non-commercial use.

Flight zones for unmanned aerial vehicles should be established by the Ministry of Transport of the Russian Federation on the proposal of the highest executive bodies of the constituent entities of the Russian Federation - the federal cities of Moscow, St. Petersburg and Sevastopol, as well as local governments. Information on the flight zones of unmanned aerial vehicles is subject to publication by the Federal Air Transport Agency in the Aeronautical Information Collection of the Russian Federation.

As the analysis of foreign legislation and special legal literature shows, the use of unmanned civil aircraft is associated with the solution of two main issues: ensuring security and confidentiality (privacy)¹². At the same time, the issue of security is a priority, while the issue of confidentiality is not always reflected in the rules on the use of unmanned civil aircraft. For example, in the US, there are no regulations at the federal level that directly address privacy issues related to drone use. So, commenting on the Rules for the operation of small unmanned aerial vehicles over people (Operation of Small Unmanned Aircraft Systems Over People¹³) The Federal Aviation Administration (FAA) stated that “privacy issues are outside the focus and scope of the rules.” Drone users are subject to different privacy laws and regulations. In addition, privacy issues related to the use of drones are regulated by some state governments. In particular, in 2019, California amended State Law No. 1129 (Assembly Bill No. 1129) stating that it is an offense to use drones to invade a person’s privacy. Tennessee (a state with a significant music and concert industry) has also banned the use of drones to photograph and film people or events with more than 100 people, unless otherwise agreed¹⁴.

According to Rebecca Scharf, state legislatures are slowly developing laws to protect privacy. That being said, these pieces of legislation largely remain untested (untested) as they are speculative and stem from general privacy provisions that do little to address the nuances and technological features of drones¹⁵.

¹² See for example: *Volovelsky, U.* Civilian uses of unmanned aerial vehicles and the threat to the right to privacy – An Israeli case study // *Computer Law & Security Review*. 2014. Vol. 30, Issue 3.

¹³ https://www.faa.gov/sites/faa.gov/files/2021-08/OOP_Final%20Rule.pdf

¹⁴ *Lee D., Hess DJ, Heldeweg MA* Safety and privacy regulations for unmanned aerial vehicles: A multiple comparative analysis // *Technology in Society* Volume 71, November 2022, 102079. https://www.sciencedirect.com/science/article/pii/S0160791X22002202?ref=cra_js_challenge&fr=RR-1.

¹⁵ Scharf, Rebecca L., “Drone Invasion: Unmanned Aerial Vehicles and the Right to Privacy” (2019). *Scholarly Works*. 1217. <https://scholars.law.unlv.edu/facpub/1217>.

A different approach to privacy when regulating the operation of drones in Germany. In addition to safety, the rules of this country prohibit the use of unmanned aerial vehicles over residential property if they weigh more than 0.25 kg or they can receive, transmit or record optical, acoustic or radio signals¹⁶.

At the moment, the few rules for the use of unmanned aircraft in the Russian Federation do not contain provisions directly related to ensuring confidentiality. Considering that Russian legislation is clearly sectoral in nature, it can be assumed that issues related to ensuring confidentiality when using drones will be the subject, first of all, of civil legislation. However, questions confidentiality, in our opinion, can be partly regulated when establishing rules for the operation of drones. In this regard, noteworthy is the rule in force in EU member states¹⁷, in order to protect privacy, if a drone has sensors that can violate privacy, it must be registered.

As for the issue of the safety of using unmanned aerial vehicles, the rules in force in the Russian Federation are developing, in our opinion, in two main directions: ensuring the safety of their operation in the “sky” and minimizing the negative impact of drones on activities related to the use of land¹⁸.

Like many other states, the Russian Federation determines the maximum height of a drone flight (150 m), but does not establish a minimum height (lower flight limit), which causes uncertainty in determining the rights of persons using land plots to airspace. In our opinion, the minimum flight altitude of a drone must necessarily ensure not only the safety of persons on the ground, but also the possibility of normal operation of the land for its intended purpose.

As mentioned above, the legislation in the field of drone use is at the initial stage of formation, however, as the technology of unmanned aircraft develops, which is strategically important for the Russian Federation, it will obviously be filled with new rules. Among them, taking into account the American experience, we would include the rules for the use of drones: at night; over moving vehicles; outside the line of sight of the remote pilot (long flights). In our opinion, such a condition for the use of drones as “daylight hours” will also require clarification. For example, in Australia, operators must not use drones “at night or in conditions of poor visibility, including overcast or fog¹⁹.”

It seems that the further development of Russian legislation will follow the path of differentiating the rules for the use of drones depending on their characteristics (primarily weight) and purposes of use (non-commercial and commercial use).

¹⁶ Lee D., Hess DJ, Heldeweg MA Decree. op.

¹⁷ Regulation (EU) 2019/947 of May 24, 2019 on the Rules and Procedures for the Operation of Unmanned Aircraft. URL: https://eur-lex.europa.eu/eli/reg_impl/2019/947/oj/eng

¹⁸ For more details, see: *Eiriyān G.N.* Drones: a view from the standpoint of land legislation // *Lex Russica* . 2020. T. 73. No. 10. S. 63–72. DOI: 10.17803/1729-5920.2020.167.10.063-072.

¹⁹ <https://www.casa.gov.au/knownyourdrone/drone-rules>

References

1. *AIP Conference Proceedings* 2172, 080012 (2019); <https://doi.org/10.1063/1.5133570>. Published Online: November 13, 2019.
2. Dolan AM, Thompson, RM, II. *Integration of Drones into Domestic Airspace: Selected Legal Issues*. URL: <https://sgp.fas.org/crs/natsec/R42940.pdf> (accessed 03.07.2023).
3. Lee D., Hess DJ, Heldeweg MA *Safety and privacy regulations for unmanned aerial vehicles: A multiple comparative analysis // Technology in Society*. 2022 Vol. 71, 102079.
4. Volovelsky, U. *Civilian uses of unmanned aerial vehicles and the threat to the right to privacy – An Israeli case study // Computer Law & Security Review*. Volume 30, Issue 3, June 2014, Pages 306-320.
5. Scharf, Rebecca L., *Drone Invasion: Unmanned Aerial Vehicles and the Right to Privacy*. (2019). *Scholarly Works*. 1217. <https://scholars.law.unlv.edu/facpub/1217>.
6. Eiriyani G.N. *Drones: a view from the standpoint of land legislation // Lex Russica*. 2020. V. 73. No. 10. S. 63–72.

“能力主义”作为一种社会歧视形式 针对残疾人
«ABLEISM» AS A FORM OF SOCIAL DISCRIMINATION
AGAINST PEOPLE WITH DISABILITIES

Nosyreva Alyona Evgenievna

advocate

Nonprofit Organization «College of advocates»

№64 Yaysky district Kemerovo region

assistant

Kemerovo State University

注解。 在现代对激进主义运动的理解中，“残疾主义”是一个定义，它揭示了基于残疾人“自卑”表现的歧视性待遇或压迫，主要是由于身体、心理、认知、智力、感官和能力的存在。 其他健康缺陷。 今天，世界各地普遍存在的“能力主义”是人权领域最常见的侵犯和践踏形式之一，这实现了对该领域的全面研究和执法系统的改进。 这项研究扩大了对确保公民宪法保障的认识和重要性，也提请人们关注社会中残疾人的社会困难。

关键词：“残疾主义”、歧视、残疾人权利的法律保护。

Annotation. *In the modern understanding of activist movements, «ableism» is a definition that reveals discriminatory treatment or oppression of people with disabilities based on the representation of their «inferiority», mainly due to the presence of physical, mental, cognitive, intellectual, sensory and other health deficiencies. Today «ableism», which is ubiquitous all over the world, is one of the most common forms of violations and abuses in the field of human rights, which actualizes a comprehensive study of this area and the improvement of law enforcement systems. This study expands the understanding and importance of ensuring constitutional guarantees of citizens, and also draws attention to the social difficulties of disabled people in society.*

Keywords: *«ableism», discrimination, legal protection of the rights of people with disabilities.*

The universally recognized principles and norms of international law state that «every person is the highest value» of any state, which determines the functioning of democratic imperatives: equality, respect for the dignity of the individual, freedom in the realization of legitimate interests, tolerance to social difficulties, and moral attitudes of humanism.

The development of any society and the progress of culture are impossible without a full-fledged human personality who has a sense of self-worth, constitutional and legal status, equality in the realization of opportunities, the right to access to social institutions and mobility in public life [13, p.1530]. Undoubtedly, fundamental rights and the free realization of any person, regardless of social status, health status, gender, nationality, religion and other factors, are the basis of a modern socially-oriented rule of law state [10, p.180].

Today, the decisive factor for a person's full self-realization and awareness of moral value in society is the «social context», which can guarantee freedom in the realization of a person's legitimate interests or «turn a person into a big load» [5, p.32], which destroys traditional values.

In particular, in practice, people with disabilities are more likely to face «ableism», or otherwise discrimination and injustice in obtaining social benefits, they often become objects of stigmatization, are subjected to degrading treatment (the following vulnerabilities are used: «defective», «inferior», etc.), which mediates the formation of an intolerant atmosphere in society. There are such phenomena as: «handicapism» (discrimination of citizens with physical disabilities); «audism», «surdophobia» (discrimination of citizens with sensory disabilities: deafness, blindness, etc.); «mentalism», «sanism» (discrimination of citizens with mental, intellectual and mental health problems); «haitism» (discrimination of citizens whose height is not within an acceptable range) and much more [6, p.57]. At the same time, in these forms of discrimination, in essence, «disability» is considered from the position of «error, rather than as human diversity» [11, p.22].

These negative phenomena mediate the importance of compensatory and protective measures of states aimed at making up for infringements in the rights of people with disabilities. In particular, it is the available mechanism of legal protection and state guarantees that can affect the implementation of inclusion programs, weaken exclusivity, accumulate their social interaction and support personal independence.

«Ableism» is a special vision of legal reality, mediated by outdated prejudices against a certain social group (citizens with «special features» of health, development), which forms fragmentation in society.

According to V. Chouinard, «ableism» is an ideology, a practice of social relations involving the assessment of a person's «ability to work» (competitiveness), which causes the marginalization of the social community of citizens on the basis of health status [3, p.380]. R. Amundson, G.Taira consider this phenomenon from the position of a «formed doctrine that falsely considers violations («health deficiencies») as circumstances hindering legal freedom, as well as burdening the interests of an authorized entity (employer, legal representative)» [1, p.54].

Ableism is a type of suprematism (derived from the latin word «supremus», namely: «superior» or «excellent»), leading to the devaluation of the status of peo-

ple with disabilities based on their alleged lack of abilities that do not serve the interests of society. This form of discrimination can be embedded in the institutions, systems and legal culture of society, antagonism and isolation, which is aimed at excluding people with disabilities. As correctly L. Madeira noted, today «ableism is difficult to recognize, since such discrimination against disabled people has become so normal and ubiquitous that we do not even notice it» [8].

T.P. Vasilyeva, T.V. Volkodav, in their scientific work emphasized that ableism should be considered as «systemic discrimination in favor of the able-bodied population» [14, p.20], in which there is no understanding of the social problems of people with disabilities, and in some cases indirectly prejudices about the «inferiority» of such citizens.

Consequently, ableism is: on the one hand, an ideology that characterizes «disability» through a stigmatized label of «inferiority», which does not fit into the «norm» of life, and therefore is alien to public consciousness. On the other hand, as «vulnerable», «not protected», requiring control and additional investments, guarantees from society and the state.

In fact, this form of discrimination can appear in various manifestations: firstly, in the ableism vocabulary (the use of terminology: «cripple», «mentally retarded», «deaf», etc.). Secondly, in the ableism approach (refusal to accept documents to an educational institution due to the applicant's disability; low wages compared to other colleagues; restriction in adoption; creation of inaccessible infrastructure, and so on), thirdly, in the ableism motivation (devaluation of the disabled person's abilities; the establishment of a value guideline that contradicts constitutional principles; isolation that artificially protects a disabled person and others) [12, p.42].

The Convention on the Rights of Persons with Disabilities of 2006 stipulates that «disability» is always in interaction with «environmental barriers» that prevent them from effectively participating in society. In particular, the 2011 World Report on Disability emphasized that people with disabilities from all countries of the world face daily ableism when exercising their special legal status (free access to medical care, employment, decent education, political participation, use of transport, information, etc.) [10, p.179]. Of particular difficulty are the problems in the field of housing, social life and communication, access to public places (places of entertainment) and justice, qualified legal assistance [9, p.65].

Ableism as a phenomenon of social discrimination forms a «sense of guilt» in a person only for the presence of his «peculiarities» of health. In particular, people with disabilities (children with disabilities) may be treated differently than other citizens under the same life circumstances or conditions, and they may also experience labeling in the context of the eugenicist trend. Disabled people everywhere face injustice, segregation and dependence on state subsidies due to the lack of an elementary opportunity to use their rights, which are commonplace for other citi-

zens (for example: to travel by public transport; go for a walk; communicate with peers, colleagues; get a job; seek legal assistance, etc.).

It is worth noting that, according to statistics, people with disabilities are subjected to more violence than citizens without disabilities. In the review of the British Journal, the percentage of violent crimes was given, in which 57.3% of the victims were citizens with mental disabilities or intellectual development; 21.3% were citizens with physical disabilities (musculoskeletal problems, sensory and cognitive disabilities)[4, p.233]. In turn, more than 54.4% of women with disabilities are subjected to sexual violence (pressure) (of which: 19.8% are threats of a sexual nature), 23.2% of children with disabilities (of which: 2.2% are threats of a sexual nature), 3.1% of men with disabilities. Thus, citizens with disabilities are subjected to physical and sexual violence three times more often than citizens without disabilities. In addition, education statistics indicate that almost 89.2% of children with disabilities in developing countries do not attend an educational institution, according to UNESCO. Studies show that violence against disabled children is committed at least 1.7 times more often every year than against their peers who do not have disabilities [4].

A study by K. Fisher, C. Purcul shows that many people hold negative views that mediate obstacles to equality for people with disabilities [7, p.162]. This attitude may be caused by misconceptions about the problems of disabled people in the media, the lack of anti-discrimination legislation and law enforcement practice to protect the rights of citizens, as well as inclusive education.

By its legal nature, ableism is a global problem, in the absence of combating which, new forms of discrimination may be generated in the future, creating even more inequality in society[2, p.19]. The popularization of the «negative culture» generates the exclusion of citizens from the process of life, and in the worst case creates insurmountable requirements for the realization of the opportunities of disabled people (employment; getting a decent salary; creating a family, raising (adopting) children, etc.).

Thus, ableism causes discrimination and further marginalization of disabled people. But it should be understood that the problem of social and legal integration of disabled people is not connected with the presence of health deficiencies that cause a restriction in the realization of social potential, but with the labeling of “inability”, limiting even the opportunity to demonstrate their knowledge (skills), to realize their legitimate interests and freedoms. Therefore, ableism is rooted in the behavior of a discriminating person, and not in the presence of a citizen with the status of a «disabled person». Only through a loyal attitude formed in society and respect for the rights of another person, regardless of the presence of «peculiarities» of health, legal education, as well as a human rights mechanism, can counteract ableism, which, in the future, will positively affect the legal status of disabled people.

State guarantees must comply with the principles of: taking into account special opportunities (health characteristics), accessibility to social institutions, adaptability to various needs of the population (living conditions, material condition, provision of inclusive communication and information technologies, etc.), taking into account the uniqueness of citizens (the legal status of women with disabilities, children with disabilities). More decisive actions of the state, the actualization of the problem of ableism in modern society, regulatory adjustments can be a step towards achieving equality and eliminating discrimination of citizens, which constantly lead to sad consequences around the world.

References

1. Amundson R., Taira, Gayle *The Effects of Life Experience on the Perceived Morality of the Policy of Physician-Assisted Suicide // Journal of Policy Studies* . – 2005. – no.16(1). – P.53-57. DOI:10.1177/10442073050160010801.
2. Chassis V. *Data Ableism: Ability Expectations and Marginalization in Automated Societies // Sage Journals*. – 2022. – no.12– P.3-20. DOI: <https://doi.org/10.1177/152747642210776>.
3. Chouinard V. *Difference: Challenges Ableist Geographies // Environment and Planning : Society and Space*. – 1997. – no.15 . – P.379-387.
4. Dammeyer J. & Chapman M. *A national survey on violence and discrimination among people with disabilities // BMC Public Health*. – 2018. –no.355. –P.231-240.
5. Dominelli L. *Gender neutral? Women's experience of disability // Journal of Social Policy Research*. – 2004. – № 2(1). – C.29-52.
6. Duncan R. *The Ablism: Impairment, Disability, Handicap // Journal of Social Work Education*. – 2022. – no. 14 (2). – P.55-64.
7. Fisher, K.R. and Purcal, C., 2017. *Policies to change attitudes to people with disabilities // Scandinavian Journal of Disability Research* – no.19(2). – P.161-174. DOI: <https://doi.org/10.1080/15017419.2016.1222303>
8. Garland A. L. *Preface: trans. A. L. Peck*. – Cambridge: Harvard University Press, 2020. 172 p.
9. Mauck G. *Combating discrimination on the grounds of disability in international and eu law // Innovative Issues and Approaches in Social Sciences*. –2019. –Vol. 6. –no. 1. –P. 64-76. DOI:10.12959/issn.1855-0541.IIASS-2013-no 1-art04
10. Nosyreva A.E. *The legal status of persons with disabilities: foreign experience // Materials of the International Scientific Conference «Law enforcement in public and private law»*.– 2021. – C.179-184.
11. Rogozhkina S. *Stigmatization of disability // Council of Europe*. –2018. – no. 10 – P.20-25.

12. Savina A. *In a Spartan way. Whether a person must necessarily be healthy. What do we know about ableism // Wonderzine.* – 2017. – №1. – С.40-52.
13. Usmanov Zh. B. *The concept of «human dignity» and its scientific and philosophical essence // Young scientist.* – 2015. – № 10. – С.1530-1535.
14. Vasilyeva T.P., Wolfhound T.V. *The study of ableism and disability in art pedagogy // International scientific review.* – 2016. – №7. – С.20-28.

基于民族导向的方法培养中国和印度尼西亚学生的表达能力
**FORMATION OF ARTICULATION SKILLS IN STUDENTS FROM
CHINA AND INDONESIA BASED ON AN ETHNO-ORIENTED
APPROACH¹**

Revenko Inna Vladimirovna

Candidate of Philological Sciences, Associate Professor

Krasnoyarsk State Pedagogical University n.a. V. P. Astafyev

注解。 本文描述了以民族为导向的方法在包括来自中国和印度尼西亚的学生在内的多元文化群体中的应用。 文章作者证实了民族导向的方法对俄语作为外语教学的有效性的影响。 以语音水平为例, 考虑了考虑到两个亚洲民族的语音困难特征而进行声音产生的可能性。

关键词: 以民族为导向的方法, 俄语作为外语, 民族心理肖像, 语音困难, 声音制作。

Annotation. *The article describes the application of ethno-oriented approach in a multicultural group including students from China and Indonesia. The author of the article substantiates the influence of ethno-oriented approach on the effectiveness of teaching Russian as a foreign language. On the example of phonetic level the possibility of working on the production of sounds taking into account the phonetic difficulties characteristic of the two Asian ethnic groups is considered.*

Keywords: *ethno-oriented approach, Russian as a foreign language, ethno-psychological portrait, phonetic difficulties, sound production.*

One of the important challenges of modernity is the need to adjust approaches to teaching, to find ways to improve its effectiveness. One of such ways is the application of ethno-oriented approach. “For effective organisation of language teaching it is necessary to rely on psychological and pedagogical and psychological-linguistic knowledge about the regularities of the course of ... thought processes of students in their native and studied languages” [Shmalko-Zatinatskaya 2022: 186].

¹ The research was carried out under the project “Study of mechanisms of motivation of Indonesian students to learn Russian language as a means of intercultural communication”, which is implemented with the financial support of the Ministry of Education of the Russian Federation, within the framework of the state task № 073-00018-23-02).

Ethno-oriented approach implies “taking into account the national-psychological features of the student population (national-cultural mentality and ethno-consciousness of foreign students)” [Chuksina 2018: 64-65]. [Chuksina 2018: 64-65].

The ethno-oriented or nationally oriented approach is based on a number of important principles. The principle of national contextualisation of learning implies the choice of pedagogical means and methods that are understandable to the representatives of a given ethnic group and correspond to their traditions.

An important aspect in the choice of teaching methods and means is the compilation of an ethnic psychological and pedagogical portrait of students. When drawing up such a portrait, it is necessary to take into account the ethnic and personal characteristics of students (features of national mentality, religion, traditional values, temperament, communicative features).

An important part of the ethnic portrait of students is the identification of the specifics of the national education system, which allows us to identify possible areas of tension in the learning activities of foreign students in the walls of Russian universities. Staying in a different linguistic and social environment, especially at the initial stage of education, often leads to culture shock. Psychological discomfort can be greatly aggravated by differences in scientific and methodological approaches, in the organisation of learning, its methods, means and content. The organisation of teaching Russian as a foreign language taking into account the ethnic portraits of students will make it possible to integrate the Russian and known to the students educational systems and minimise the consequences of culture shock.

The construction of training taking into account the ethno-psychological characteristics of students should not contradict one of the leading principles for ethno-oriented teaching, the programme-target principle, the essence of which is that “each level of education is a completed educational cycle characterised by a single set of requirements specified in the state educational standard” [Rementsov, Kozhevnikova 2013: 8-10].

Compilation of ethno-pedagogical and ethno-psychological portraits of students becomes especially important in multicultural groups, where the organisation of training requires flexibility and observance of the interests of all students. Based on the data of researchers and our own experience of teaching foreign students, we will make ethno-psychological portraits of the two most numerous Asian ethnic groups: Chinese and Indonesian.

Describing the traits of the national character of these ethnoses, the following can be mentioned as the main ones: unpretentiousness, moderation, enterprise, leisureliness (for the Chinese ethnoses); curiosity, modesty (for the Indonesians). According to I.A. Pugachev, philosophy and religion had the greatest influence on the formation of these traits of national character of both ethnic groups [Pugachev 2011]. The researchers recognise diligence as an integral trait for the compared

ethnic groups. When organising training in a multicultural group, this common character trait of students can be used when organising independent work and project activities.

The communicative orientation of RCT teaching implies modelling situations similar to real communication, motivating students to interact while performing learning tasks. High efficiency in the formation of communicative skills can be achieved only if the specifics of communicative behaviour of students from different ethnic groups are taken into account.

Comparing the features of communicative behaviour of Chinese and Indonesians, we can state the presence of common features of Chinese and Indonesian ethnic groups, in particular, such as: politeness, restraint, discipline, desire to save face. As for the differences, it is worth noting the persistence of Chinese students in achieving the goal, the search for workarounds in case of difficulties (this trait can be explained by the stratagem thinking of the Chinese ethnos). Indonesians are characterised by a trait called “elastic pliability”; it manifests itself in the readiness to accept another’s point of view without giving up their own.

The application of an ethno-oriented approach in a multicultural group involves a comparison between the learners’ native language and Russian. “When selecting and presenting teaching material, the teacher is guided by the comparison of similar and dissimilar phenomena in the native and learnt languages” [Shmalko-Zatinatskaya 2022: 185]. In the course of such a comparison the zones of incompatibility of language systems are revealed, the most probable difficulties for each of the language levels are predicted. Such a prediction is the basis for building a learning route. Under the learning route we understand the plan of learning material mastering, which takes into account the peculiarities of the contingent as much as possible and in accordance with them selects and structures the material, builds the sequence of studying topics and sections of the programme, selects the most effective techniques and methods.

Thus, when organising training in a group including Chinese and Indonesians, it is advisable to establish such a sequence of studying the material, in which the topics that cause difficulties for students of both ethnic groups are mastered first. In this case, the sequence of sound production is important, which implies successive progression from sound to syllable, from syllable to word, from word to phrase, from the easiest position to the most difficult one. The latter are established “taking into account the peculiarities of the phonetic system of both the Russian language and the learner’s native language” [Lyubimova 1982: 33]. For representatives of each particular language, a different sequence of phonetic positions is established for the production and correction of a particular sound. This sequence allows to reflect the peculiarities of the sound system of the Russian language and the peculiarities of the sound system of the learner’s native language.

Thus, for example, in modern Indonesian language “consonants form oppositions of voicing-deafness, but these oppositions are practically indistinguishable in speech. In the flow of speech, vowel and consonant sounds regularly alternate. Vowels are not reduced, they are pronounced openly...” [Shcherbakova 2017: 211]. These features of the phonetic system of the native language of Indonesians give rise to difficulties in distinguishing between deaf and voiced consonants, and in not distinguishing between vowels in strong and weak positions in Russian. Similar difficulties are observed in students from China. The feature “deafness-voicelessness” exists in Chinese only formally, as the main differentiating factor is “strength-weakness”. “Strong consonants of Chinese can be called stunned, or incompletely voiced variants of voiced consonants. Weak consonants, on the other hand, are most often aspirated variants of Russian deaf consonants” [Rakitina, Rozova 2014: 285].

In the area of consonantism for Indonesians “the most difficult for pronunciation are hisses [g], [sh], affricates [ch], [ts], English speakers have a problem with the production of sonorant consonants [r] and [l]..., mixing of whistles and hisses [s] / [sh], bowed and slit whistles and hisses [s], [ts], [ch], [sh’], [sh]” [Yazovskaya 2015: 43]. [Vyazovskaya 2015: 43].

When mastering the phonetic system of Russian, the hard-soft distinction of consonant articulation causes significant difficulties for Chinese and Indonesian students. The placement of this articulatory feature is of great importance because “in Russian consonantism it is phonological, i.e. it serves to distinguish words” [Andreyushina 2014: 20] [Andreyushina 2014: 20].

To eliminate these difficulties, the position of the beginning of the word in the stressed syllable is used for the pronunciation of deaf consonants during the introductory phonetic course. The peculiarities of articulation of voiced consonants can be traced by the intervocalic position in the stressless syllable. The position at the beginning of the word under accent is maximally indicative of the distinction between deaf and voiced. Pronunciation and elimination of these difficulties is achieved through imitative exercises in which not only the teacher’s speech but also audio and video content is used as a speech sample. This makes it possible to bring the learning situation closer to real communication, to combine and develop different types of speech activity in parallel: listening - speaking, listening - writing - reading, listening - reading. In the Russian language, the realisation of a sound is determined by its position in the word and in the flow of speech, which leads to a mismatch between grapheme and phoneme, so an important aspect in teaching phonetics is to fix the relationship between the sound and its graphic realisation.

In our practice for the production of sounds we actively use cursive phrases (in the version of pure-speak), children’s counting rhymes, short poems, which are

used to memorise the letters of the alphabet. For example, for the placement of the vibrant [r], which, due to the absence of such a sound in the phonetic system of the Chinese language, causes serious phonetic difficulties, we use cursive phrases: *Karl stole Clara's corals*, *Greka travelled across the river*, etc. The following words are used in our practice.

Another phonetic difficulty in the pronunciation of sonorant consonants for Chinese students is the blending of sounds [r] and [l], [r'] and [l']. Working with words that include these sounds (for example, laboratory) and cursive phrases helps to overcome this difficulty: Valery caught two buckets of trout and treated Daria and Lukeria with trout. Didactic materials placed in the open access on the portal "Education in Russian" of the Pushkin State Institute of Russian Language (<https://rus4chld.pushkininstitute.ru/#/schoolyard/skorogovorki>) help to develop listening skills in the process of production of consonant sounds.

According to I.A. Pugachev, "taking into account the ethno-pedagogical peculiarities of foreign students ... will increase the effectiveness of teaching Russian language, strengthen the motivational factor in the process of language acquisition" [Pugachev 2011: 12]. [Pugachev 2011: 12]. The route of learning (plan of passing the discipline), built taking into account the forecast of difficulties relevant for speakers of a particular language, is a model of learning, aimed at achieving maximum effect, but, at the same time, quite flexible and assuming the possibility of correction in the process of work taking into account the peculiarities of a particular group of students.

References

1. *Andreyushina E.A. Difficulties of learning Russian phonetics by foreign-speaking audience depending on the native language of students // Philological Sciences. Issues of theory and practice. - Tambov: Gramota, 2014. № 12 (42): in 3 parts. p. II. p. 19-22.*
2. *Vyazovskaya V.V. On the specifics of teaching Russian as a foreign language to students from Indonesia // Linguistics and Intercultural Communication Issue No. 2(16), 2015. - p. 41-44.*
3. *Lyubimova N.A. Teaching Russian pronunciation. Moscow: Russian language, 1982.- 192 p.*
4. *Pugachev I.A. Ethno-oriented methodology in multicultural teaching of Russian as a foreign language: monograph. - MOSCOW: RUDN, 2011. - 284 p.*

5. Rakitina L.V., Rozova O.G. *On violations of the realisation of Russian affricates in the speech of native speakers of Chinese at the initial stage of learning // Study and teaching of Russian language and literature in the context of modern language policy of Russia: proceedings of the XIX international scientific-methodological conference / Saint Petersburg State University of Industrial Technologies and Design. St. Petersburg, 2014. - pp. 283-287.*
6. Rementsov A.N., Kozhevnikova M.N. *Methodological bases of designing the system of training foreign citizens in the Russian higher school // Agroengineering. 2013. №4. p. 7-10. URL: <https://cyberleninka.ru/article/n/metodologicheskie-osnovy-proektirovaniya-sistemy-obucheniya-inostrannyh-grazhdan-v-rossiyskoy-vysshey-shkole> (date of reference: 26.06.2023).*
7. Chuksina I.G. *Ethno-oriented approach to the practice of teaching Russian to foreign students // Izvestiya Baltic Fishing Fleet State Academy: Psychological and Pedagogical Sciences. - 2018. - №3. - P.64-70.*
8. Shmalko-Zatinatskaya S.A. *Ethno-oriented approach when working with educational polycoded texts (from the experience of teaching Russian as a foreign language to students from the countries of the Asia-Pacific region) // Izvestiya HSPU. 2022. №203. - p. 185-197.*
9. Shcherbakova E.E. *Characteristics of Indonesian students in the context of teaching Russian as a foreign language // Philological Sciences. Voprosy teorii i praktika Tambov: Gramota, 2017. no. 2(68): in two vol. p. 2. p. 209-212.*

高中生英语电子教材内容开发与使用
E-TEXTBOOK CONTENT DEVELOPMENT AND USE FOR HIGH SCHOOL STUDENTS OF ENGLISH

Brega Olga Nikolaevna

*Candidate of Pedagogical Sciences, Associate Professor
Togliatti State University*

Kruglyakova Galina Vladimirovna

*Candidate of Pedagogical Sciences, Associate Professor
Togliatti State University*

抽象的。俄罗斯高等教育的数字化转型导致需要修改大学毕业生的语言培训方法。本文介绍高中生电子教材《专业英语》的开发和使用经验。其结构和内容已在文章中公开。该电子教科书将 SCROM 包集成到 Moodle LMS 中,提供自动检查的任务、交互式练习,并丰富了多媒体活动。学生有机会实时跟踪自己的学习成果,反思自己的成果,并获得老师的反馈。电子教科书的独特性有助于平等地学习英语,并在全球大量大学生中得到广泛使用。

关键词: 特定目的英语教学、学习管理系统、数字教育资源、教育过程个性化。

Abstract. *The digital transformation of higher education in Russia has caused the need to revise the approaches to language training of university graduates. This article presents the experience of developing and use of the electronic textbook "Professional English" for high school students. Its structure and content are disclosed in the article. The e-textbook with the SCROM packages integrated into the Moodle LMS provide automatically checked tasks, interactive exercises, and is enriched with multimedia activities. Students have the opportunity to track their learning achievements in actual time, to reflect on their results, and to get feedback from the teacher. The peculiarities of the e-textbook contribute to equal access to learning English and its wide use among large number of university students worldwide.*

Keywords: *Teaching English for specific purposes, learning management systems, digital educational resources, personalization of the educational process.*

The current situation and prospects in education for the period up to 2027 are characterized by scientists as the transition from traditional offline learning to the digital educational environments in universities [1]. The importance of digital

transformation of education, bridging digital gaps and working towards the attainment of the Sustainable Development proclaimed by the UN General Assembly [2], is manifested in going from teaching everyone to personalized education for everyone [3], in using artificial intelligence methods in education [4]. In addition, high-quality online courses are being imbedded into the traditional education, which requires not only high-quality digital educational products, but also changes of the educational ideology in general [5]. The federal project to create an effective system of high-quality distance higher education based on LMS Moodle “Rosdistant” has been successfully launched in Russia, which made it possible to completely change the educational model and promote students’ personalized educational tracks [6].

This article describes the experience of e-textbook development and its implementation, as a way to the educational digitalization and increase in the availability of English study as a part of university education.

Important in the context of digitalization is the fact of equal access of universities to digital technologies, namely:

- the establishment and expansion of the digital higher education;
- the development of assessment and certification systems for participants in the digital educational process;
- the access to regularly updated digital platforms resources, tools and services.

It is verified that to overcome the digital educational gap and to improve the education quality the society is undergoing:

- the state network establishment for digital education platforms growth;
- the experience and their methodological support share with other educators;
- the educational partnerships between universities and business.

The authors support Jihae Shin’s opinion that in distance education, students’ self-study activities, based on specially arranged digital educational resources, are crucial [7]. The international report on education monitoring clarifies that in this case a small group of highly qualified content developers prepares educational content, which is then used by tutors for distance learning, which allows each tutor to work with a larger number of students than in the traditional classroom [8].

Li Huiyong and a group of his colleagues believe that to attain maximum benefit in the digital learning format is to acquire the skills different from those needed for offline learning, for example, self-reflection and self-learning skills [9].

In 2014 Togliatti State University has developed the project “Rosdistant” as a response to the challenging trends, including the emergence of new digital technologies and lack of them resulting in the digital educational gap. The project was initiated as a response to general demographic problems; reinforced by re-

gional peculiarities, created with regard to the world experience of the mass open online courses, own university's experience of point-rating assessment system, its electronic educational environment and the experience of students' self-study management.

The above mentioned trends were taken into account by the authors of the article and the group of colleagues in the development and implementation of the e-textbook "Professional English", which is successfully used at Togliatti State University within the framework of the project "Rosdistant" and has confirmed its efficiency.

The survey of students of the course "Professional English" showed high results and its effectiveness, so it has positive NPS (Net Promoter Score) measured with a single question survey and is reported close to 85%, where CSI (Customer Satisfaction Index) is also above 85% that proves students' satisfaction with the digital tools and materials of the E-Textbook "Professional English". The metric CSI is above 85%, which is a high indicator in statistical estimates.

The purpose of the e-textbook "Professional English" is to expand the foreign language skills of students in the field of business communication in English. Target audience is students of various majors studying in the project "Rosdistant". The choice of the course subjects is determined by the objectives and is based on the curriculum and key features of the target audience. It includes a wide range of interactive activities for business communication, i.e. simulates real situations of a professional communication: "Job-Hunting", "Job Interview", "Preparing for a presentation". The Module "Academic Writing", introduces students to the structure of scientific articles, the peculiarities of writing abstracts for the scientific articles and the abstracts writing for their scientific research paper, for example, for a bachelor's thesis.

Here are some examples of the tasks checked by a tutor.

1. "Research Your Future Employer" simulates the search for a potential job and "Resume" for a potential employer.
2. "Mock Interview" trains employer's questions answering, it simulates an Interview for a potential job.
3. "Negotiate Your Salary" teaches to negotiate the salary with a potential employer.
4. "Presentation text" guides the presentation speech writing.
5. "Power Point presentation" directs the visual aids creation.
6. "Presentation Audio" makes a student to practise conference speaking.
7. "An abstract of a scientific article" teaches to write an abstract for the given scientific article and the bachelor's thesis.
8. "Presenting at an academic conference" simulates communication at scientific conference.

The course is based on the principle of consistency, which gives students an understanding of the logic of the educational process and the materials introduction; this feature increases its educational value. In addition, it allows the student to understand the requirements and organize their own self-study process. The “Professional English” has its course structure.

- The module preview, the guidelines and evaluating criteria for students.
- Three thematic parts that are connected logically.
- The automatically checked final test assesses the acquired knowledge (lexical, grammatical and speech skills).
- Graded exercises allow the student to apply knowledge in practice and in real time to see their progress in studying the course.
- Active vocabulary and guidelines for studying the material (the downloadable files).
- Skill aimed final task assessed by the teachers finishes the whole module and shows the success and achievements of students in the skill development.

The e-textbook “Professional English” superior feature is that it is developed with SCORM packages integrated into the E-Moodle LMS with iSpring software. It involves students in English learning with the audios and videos (videos about the presentation of their advantages for a job position), interactive dialogues, modeling of real communication situations (job interviews, dialogues at the airport, conference presentations). The iSpring software purpose is to design interactive and multimedia e-learning resources and embed the products in such educational materials formats as SCORM for uploading and publication within the Moodle LMS.

To achieve maximum results from digital self-study, the e-textbook developers aimed the tasks at:

- motivation growth as the tasks are interactive and communicative in nature;
- the assignments develop self-organization and time management skills (the tasks are provided with guidelines and the algorithms for work);
- educational self-reflect growth (supported with the evaluating criteria for all the tasks highlighting possible points possible to gain for each module, as well as self-assessment check lists, which allow students to analyze their progress and acquired skills).

To sum up, the conducted research and the described experience meet modern demands for the organization of students’ self-education in the era of digitalization. The developed electronic textbook allows to organize effective distance learning of students and to form students’ not only hard skills, i.e. specifically professional, but also soft skills. What is significant at the moment, because according to employer surveys, flexible skills of specialists are most in demand in the labor

market, for example, skills of interaction with colleagues, time management, reflection skills, knowledge on the labor market, etc.

Thus, the electronic textbook takes into account the specifics of the use of digital technologies in teaching foreign languages, offers diverse forms of training and technologies for involving students in the process of interaction through the educational environment, as well as ways of using digital tools to ensure control, effective feedback from the teacher with students.

References

1. *Smart Education and Learning Market Size, Share and Trends Analysis Report by Age, by Component (Hardware, Software, Service), by Learning Mode, by End User, by Region, and Segment Forecasts, 2020 – 2027 [Internet]. Research and Markets, April 2020 [cited 2023 Jul 10]. Available from: <https://www.researchandmarkets.com/reports/4621713/smart-education-and-learning-market-size-share>*
2. *Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development [Internet]. United Nations, General Assembly, July 2017 [cited 2023 Jul 10]. Available from: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N17/207/63/PDF/N1720763.pdf?OpenElement>*
3. *Benhamdi S. Personalized recommender system for e-Learning environment). Education and Information Technologies [Internet]. 2017 [cited 2023 Jul 10]; 22(4): 1455-1477. Available from: <https://doi.org/10.1007/s10639-016-9504-y>*
4. *Tapalova O., Zhiyenbayeva N. Artificial Intelligence in Education: AIED for Personalised Learning Pathways. The Electronic Journal of e-Learning [Internet]. 2022 [cited 2023 Jul 10]; 20 (5): 639-653. Available from: <https://www.ejel.org>.*
5. *Kukulska-Hulme A. et al. Innovation Report 10. Exploring new forms of teaching, learning and assessment, to guide educators and policy makers. Innovating pedagogy [Internet]. United Kingdom, The Open University, 2022. [cited 2023 Jul 10]; Available from: https://www.researchgate.net/publication/362068821_INNOVATING_PEDAGOGY_2022_Exploring_new_forms_of_teaching_learning_and_assessment_to_guide_educators_and_policy_makers*
6. *Bekova S.K., Vilкова K.A., Jafarova Z.I. Onlajn bez paniki. Modeli i effektivnost' vnedreniya massovyh onlajn-kursov v rossijskix universitetax = Online, don't panic! Models and effectiveness of integration of massive open online courses into Russian universities. Sovremennaya analitika obrazovaniya. Ekspress vypusk = Modern education analytics. Express issue [Internet]. 2020 [cited 2023 Jul 10]; № 11., 24. Available from: <https://ioe.hse.ru/data/2020/05/28/1550145876/Онлайн%20без%20паники.%20Модели%20и%20эффективность..рсов%20в%20российских%20университетах.pdf> (In Russ.).*

7. Shin J. *Self-directed Learning in Music Teacher Education: Perspectives from Pre-service Music Teachers in South Korea*. *Malaysian Journal Of Music*. [Internet]. 2020 [cited 2023 Jul 10]; 9: 29-41. Available from: <https://ejournal.upsi.edu.my/index.php/MJM/article/download/3241/2551/>.

8. Burns M. *Background paper prepared for the 2023 Global Education Monitoring Report: Technology and education*. [Internet]. UNESCO, 2021 [cited 2023 Jul 10]. Available from: <https://en.unesco.org/gem-report/2023/technology>

9. Li H., Majumdar R., Yang Y., Ogata H. *Design of a Self-Reflection Model in GOAL to Support Students' Reflection*. In: *ICCE 2020 - 28th International Conference on Computers in Education, Proceedings* [Internet]. 23 November 2020 [cited 2023 Jul 10]; 1: 330-335. Available from: <https://www.scopus.com/record/display.uri?eid=2-s2.0-85099434115&origin=inward&txGid=dc185238a486e102bdc18837f6961f04>

教育数字化背景下学生价值观的传承

CULTURAL TRANSFER OF STUDENT VALUES IN THE CONTEXT OF DIGITALIZATION OF EDUCATION

Sozinova Maria Valerievna

Candidate of Pedagogic Sciences, Head of Department (BrE)

St. Petersburg University of the Humanities and Social Sciences

注解。 文章讨论了现代高等教育体系的特征及其对学生青年价值观,特别是俄罗斯传统精神和道德价值观形成的影响。 确定了现代青年价值取向向状况的特征,以及现代教育数字化背景下“西欧民主价值观”向青年国内价值观体系的转移。 描述了大学在改变学生青年价值取向的过程中的作用,通过实施以文化为中心的教育理念(A.S. Zapesotsky)来转移俄罗斯传统精神和道德价值观。

关键词: 价值观、价值取向、传统价值观、俄罗斯传统精神和道德价值观、高等教育体系、文化转移、价值观的文化转移、教育数字化、学生青年。

Annotation. *The article discusses the features of the modern system of higher education and its influence on the formation of student youth values, in particular, traditional Russian spiritual and moral values. The features of the state of value orientations of modern youth, the transfer of “democratic Western European values” to the system of domestic values of youth in the context of digitalization of modern education are determined. The role of the university in accompanying the process of changing the value orientations of student youth, the transfer of traditional Russian spiritual and moral values through the implementation of the culture-centric concept of education (A.S. Zapesotsky) is described.*

Keywords: *values, value orientations, traditional values, traditional Russian spiritual and moral values, higher education system, cultural transfer, cultural transfer of values, digitalization of education, student youth.*

The system of higher education allows a young person not only to get the desired profession, to build the necessary professional competencies, but also contributes to the formation of his general culture. It is the general culture of a person that becomes a social “elevator”, increasing its social mobility, contributing to the preservation and transmission of the basic spiritual values of previous generations.

It should be noted that the changes that have taken place in the system of higher education over the past fifty years were not progressive, but rather revo-

lutionary, significantly changing the structure, specifics of training, requirements for graduates, and the system for assessing the quality of education. In the process of transformation, the system of higher education lost the achievements of the previous Soviet period, in particular, the fundamental, educational component of training specialists, which affected, first of all, the readiness of graduates to “appropriate” professional values. The modernization of higher education was also accompanied by an increase in problems: the renewal of teaching staff; a decrease in the quality of graduate training, etc. The social upheavals accompanying the transformation of the higher education system contributed to this process: the collapse of the USSR, social instability, and a drop in the standard of living of the population. The degradation of culture and morality, the weakening of the role of education in the professional training of specialists had a significant impact on the change in the value orientations of student youth. These processes have led to the erosion of the value bases and traditional morality of society, the weakening of the natural process of cultural transfer of values in the process of continuity from the older generation to the younger.

At the same time, it is the value orientations that determine the selective attitude of a person to certain material and spiritual values, form a system of attitudes, beliefs, reflected in his behavior and attitude towards certain objects of reality. The significance of the process of formation of traditional Russian spiritual and moral values is emphasized by the Decree of the President of the Russian Federation of November 9, 2022 N 809 “On approval of the Fundamentals of State Policy for the Preservation and Strengthening of Traditional Russian Spiritual and Moral Values”, defined as “moral guidelines that shape the worldview of Russian citizens passed down from generation to generation, which underlie the all-Russian civic identity and the common cultural space of the country, strengthen civil unity, and find their unique, original manifestation in the spiritual, historical and cultural development of the multinational people of Russia” [5] . A list of traditional Russian spiritual and moral values is also defined - “life, dignity, human rights and freedoms, patriotism, citizenship, service to the Fatherland and responsibility for its destiny, high moral ideals, a strong family, creative work, the priority of the spiritual over the material, humanism, mercy, justice, collectivism, mutual assistance and mutual respect, historical memory and continuity of generations, the unity of the peoples of Russia” [5] .

Global informatization of all spheres of human life leads to rapid social changes and actualizes the need to take into account the peculiarities of the new digital world in the process of preparing modern youth in higher education. According to researchers, the digitalization of higher education creates a paradoxical effect: on the one hand, the expansion of the information base, the focus on flexible teaching methods and technologies, on the other hand, the decline in interest in cognitive

(cognitive) values, the weakening of self-learning and self-training skills, the appearance of the effect of clip thinking, lack of analytical skills, etc. [2]. Digitalization is not a stimulus for the expansion of spiritual values; rather, it creates a complex situation in the dynamics of the values of student youth, determined by the freedom of value choice within the possibilities of using information technologies by a particular student. These trends of global digitalization in modern society create favorable conditions for the cultural transfer [3] of “democratic Western European values” into the system of domestic values.

This form of value transfer has a negative impact on young people and leads to a change in their value orientations. Thus, young people experience difficulties in accepting traditional Russian values such as the value of work, citizenship, patriotism, love for the “small motherland”, etc. At the same time, they are characterized by an orientation towards Western European values - individualism, the value of success, the priority of personal achievements, material values, etc. Thus, the monitoring of the value orientations of young people in Russia, conducted in 2022 by the Institute of Education of the Russian Academy of Education [4], showed the absence of the value of work, a decrease in the value of higher education among young people. The professional choice of young people is determined by high wages and personal interests. There is no motive to serve people in choosing a profession. The civic position is poorly formed, which is manifested in the lack of awareness of civic responsibility, interest in participating in the affairs of the country. Young people are characterized by a contradictory understanding of patriotism: most of the respondents consider themselves patriots, while some of them declare their desire to emigrate in the future. The respondents have vague ideas about spiritual and moral values. Monitoring data show that for young people traditional values are not a way of life, they are perceived by them as a speech cliché. At the same time, “democratic Western European values” were accepted by our youth, which indicates a violation of the process of natural transmission of the system of traditional values from the older generation to the younger. In the context of global digitalization, the traditional conflict of generations has escalated, which has led to a value gap between them, when a natural way of transferring values is impossible. Young people tend to reject the values of the older generation, which leads to a deterioration in the socio-psychological and political situation in society.

At the same time, it is the system of higher education that has a unique opportunity to influence the system of value orientations of student youth. The student comes to the university with his own value orientations, which were formed at the previous educational stage under the influence of the family, school teachers. The features of the period of student life are characterized by: on the one hand, distance from the family, reduced communication with its members, relocation to another district, city, region of the country, on the other hand, it is accompanied

by an active impact on the student of global media (social networks, the Internet, etc.), which lead to a change in value orientations, replacing them with others. The role of the university is growing in accompanying the process of value orientations of student youth, the transfer of traditional Russian values, opposition to Western values that penetrate through the global digitalization of the life of modern society.

In this context, a return to the positive past experience in the system of Soviet higher education can become the resource that will make it possible to resist the cultural transfer of Western values among young people. It is the reliance on traditional Russian spiritual and moral values that will make it possible to overcome the crisis of generations that has formed in society, and the appeal to relevant Soviet cultural practices (for example, collective creative work) will make it possible to form the necessary educational system for the transfer of values. In the conditions of modern education, the role of a university teacher as a carrier and translator of traditional Russian spiritual and moral values is growing. A positive example of the preservation and transmission of traditional Russian spiritual and moral values in a university can be the culture-centric concept of education [1], which is implemented on the basis of the St. Petersburg Humanitarian University of Trade Unions. The importance of this experience of educational activity requires further understanding and dissemination in the context of digitalization of higher education.

References

1. Zapesotsky, A. S. *Culturological understanding of actual problems of our time: reports at the International Likhachev Scientific Readings (1997-2019)* / A. S. Zapesotsky ; ed. A. D. Nekipelov; St. Petersburg University of the Humanities and Social Sciences. - St. Petersburg: Publishing House of St. Petersburg State Unitary Enterprise, 2019. - 264 p. - URL: http://library.gup.ru/jirbis2/index.php?option=com_irbis&view=irbis&Itemid=108&task=set_static_req&sys_code=71/3-31-818571529&bns_string=IBIS
2. - ISBN 978-5-7621-1051-8 -
3. Ivanenko, N.S., Zagorodniuk, E.V. *The dynamics of the values of student youth in Russian society in the context of the digitalization of higher education // Humanitarian of the South of Russia, 2021, Volume 10 (49), No. 3, pp. 138-147.*
4. Melnikova, A.A., Lipnitskaya, O.G., Sozinova, M.V. *Territorial and cultural communities as a new direction of transgenerational cultural transfer in the social sphere: Russian specificity// Society. Wednesday. Development. 2023. No. 1 P.104-109.*

5. *The New Values of Youth: A Study*. Access mode: <https://xn---dtbhvcrdbcoh1a.xn--p1ai/novye-cennosti-molodezhi-issledovanie-v-rossii/>

6. *Decree of the President of the Russian Federation of November 9, 2022 N 809 «On approval of the Fundamentals of State Policy for the Preservation and Strengthening of Traditional Russian Spiritual and Moral Values* « Access mode: <http://ivo.garant.ru/#/document/405679061/paragraph/14/doclist/2722/showentries/0/highlight/About%20preservation%20and%20strengthening%20%20oftraditional%20spiritual-moral%20values:1>

DOI 10.34660/INF.2023.60.97.097

以口语为中心作为初级汉语教学的基本方法
**SPOKEN LANGUAGE CENTRALITY AS THE BASIC METHOD OF
TEACHING CHINESE AT THE ELEMENTARY LEVEL**

Wang Lin

postgraduate

St. Petersburg Polytechnic University

Almazova Nadezhda Ivanovna

Doctor of Pedagogical Sciences, Full Professor

St. Petersburg Polytechnic University

抽象的。本文致力于研究采用口语中心强化法进行对外汉语基础课程教学的可能性。研究了保加利亚和俄罗斯著名教师和心理学家关于强化外语教学方法著作，分析了俄罗斯和美国学者关于汉语口语教学的科学文章。借鉴了森潭学校在附加教育体系中教授对外汉语初级课程的教学经验。由于大多数学习者的目标是尽快掌握交际能力，因此基于口语中心原则，采用拉丁拼音转写的方式开发了汉语强化教学法，同时推荐象形文字的书写和阅读教学。描述了引入强化口语进步方法的教学条件。

关键词：对外汉语、初级水平、强化方法、口语中心性、拼音、口语进步、交际。

Abstract. *The article is devoted to the study of the possibility of teaching the elementary course of Chinese as a foreign language using an intensive method of spoken language centrality. The works of well-known teachers and psychologists on intensive methods of teaching a foreign language in Bulgaria and Russia are studied, scientific articles of Russian and American scholars on teaching Chinese using oral advance are analyzed. The pedagogical experience of teaching the elementary course of Chinese as a foreign language at the Sentan school in the system of additional education is considered. Since most learners are aimed at acquiring communication skills as soon as possible, an intensive method of teaching Chinese has been developed based on the principle of spoken language centrality using Latinized pinyin transcription, while teaching hieroglyphic writing and reading is recommended later. The pedagogical conditions for the introduction of an intensive method of oral advance are described.*

Keywords: *Chinese as a foreign language, elementary level, intensive method, spoken language centrality, pinyin, oral advance, communication.*

Introduction

Teaching a foreign language (FL) at private courses of additional education in Russia is qualitatively different from teaching a foreign language in the form of basic and special education on a budgetary basis. The main difference is that students of private courses have more clearly defined personally determined goals for learning a foreign language, that is, they are more motivated. In connection with this factor, they more strictly and critically evaluate the content of the course and the skill of the teacher. Realizing this, the teacher at private courses should constantly maintain the interest and motivation of students all the time by improving his/her methodological skills, and abilities in order to let students achieve their education aims. Our survey of the students attending Sentan Chinese language course [1] shows that most of them are focused on the earliest possible acquisition of communication skills as the highest priority for the realization of their life goals. Thus, we are considering the implementation of spoken language centrality method, or an oral proactive teaching method, that could intensify the learning of spoken Chinese at the initial stage.

The goal of the article is to reveal the possibility and expediency of using the intensive method of oral advancement in the elementary course of Chinese as a foreign language.

The relevance of the study is determined by a significant increase in the number of those wishing to learn the Chinese language due to the geopolitical changes in Russia.

The research method is a theoretical analysis of pedagogical works on intensive methods of teaching foreign languages and the methodology of oral, or verbal, anticipation at the initial stage of learning Chinese as a foreign language.

Literature review. One of the first generally recognized intensive methods is the psychotherapeutic method offered by G. Lozanov (Bulgaria), which even at the present stage allows to optimize the learning process in all aspects, creates a relaxed atmosphere in the classroom. Thus, learning occurs naturally, without much effort, coercion, and at the same time most effectively. The absence of psychological pressure on the student in the “teacher-student” format releases additional memory reserves [2].

In the Russian context, the most famous follower of G. Lozanov was G.A. Kitaigorodskaya, who in her monograph “Methodology of Intensive Teaching of Foreign Languages” [3] notes that intensive foreign language teaching is understood as teaching “aimed mainly at mastering communication in the target language under study, based on the psychological reserves of students’ personality and activities not used in conventional teaching, in particular, on managing socio-psychological processes in the group and managing the teacher’s communication with students and students among themselves, and carried out usually in a short

time” [3, p.4]. Speaking and listening are both predominant and ahead of learning to read and write.

Intensive foreign language teaching is a continuation of the *direct* teaching method development, also known as the *natural method*, since this method is based on imitating the learning process of a child’s native language [4]. As one knows, all children hear their parents’ oral speech in the first two years of their lives and then begin to repeat individual words, imitating their pronunciation and intonation, while learning to read and write begins later, as the child approaches school age.

Thus, if we interpret this in terms of the methodology of teaching a foreign language, then the types of speech activity are arranged in the following order: listening, speaking, reading, and writing, with the complete exclusion of the native language of students and the teacher from the educational process. It is listening and speaking in the target foreign language that are the most important aspects of the direct (natural) method of teaching a foreign language, as well as the methods and techniques of the *intensive teaching* of foreign languages that emerged on its basis: these are audiolingual and audiovisual teaching methods.

The method of oral advance, or in other words, spoken language centrality method, which means oral centralization, dominant oral speech teaching, can also be considered intensive. It is well known both in Russia and Bulgaria, since it is used at the first stage of foreign language learning in all secondary schools [5, 6]. The first stage of learning a foreign language in regular schools lasts, as a rule, for a period of two months, that is, the whole first quarter of the school year. Students take an introductory phonetic course, the elements of which are then repeated throughout the foreign language course.

Research results and discussion. The use of the method of spoken language centrality in teaching Chinese as a foreign language is also described in the scientific and methodological literature. This method is recommended, in particular, by the famous methodologist on teaching Chinese, O.A. Maslovets, who, in her article on the criteria of choosing and creating a textbook on Chinese as a foreign language [7], notes the necessity of oral advance and approximation at the initial stage of teaching. The implementation of the approximation principle implies that the teacher, assessing the students’ speech activity, does not pay attention to the errors in language and speech, that do not violate the communicative act of speech, do not interfere with getting the necessary information.

The oral advance method is the leading method of communicative approach in foreign language teaching. As part of teaching hieroglyphics, “the oral advance method is based on learning Latin pinyin transcription for 5-6 months without learning hieroglyphics. During this period, students orally learn and practice single-syllable words and sentences, as well as some grammatical phenomena that

form the basis of ‘linguistic flair,’ and only then begin to be introduced to hieroglyphics.” [8], since “knowledge of hieroglyphs is not a priority goal of training”. [ibid, p.128].

Thus, the use of the oral, or verbal, advance method is essentially separate instruction in spoken language and hieroglyphics, where speaking and listening are taught separately from reading and writing practice. At the end of the phonetic course, students develop speaking and listening skills separately from reading and writing skills. According to the methodologist, the main thing is to develop students’ listening and speaking skills and abilities.

Considering the method of oral advance teaching Chinese as a foreign language, it is interesting to refer to some other Russian researchers-methodologists, famous authors of the monographs on teaching Chinese, I.V. Kochergin and N.A. Demina. I.V. Kochergin in his research work devoted to the philological issues of teaching Chinese as a foreign language, expresses an ambiguous attitude to the oral advance method: on the one hand, he points out that much less attention is paid to teaching Chinese writing [9, p. 35], which is undeserved, but in another part of his monograph he is inclined to approve the oral advance method.

Indeed, considering the hypothesis of the decisive role of the speech-motor analyzer in the development in ontogenesis of a child’s written speech, the author summarizes that, following this hypothesis, “we can assume that in the learning process the formation of oral speech skills should precede the formation of writing and reading skills”. [9, c. .109]. This assumption, in the opinion of the author, a teacher of the Chinese language with many years of experience, is extremely relevant for the Chinese language with its hieroglyphic writing.

N.A. Demina’s monograph on the methodology of teaching Chinese as a foreign language does not contain direct recommendations on oral advance in the study of Chinese at the initial stage, but the author, focusing on school education, recommends introducing only the basics of hieroglyphic writing in elementary school, and systematic familiarity with hieroglyphics to begin in the fifth grade. The author underlines the principles of universal usage and frequency in selecting the hieroglyphic material for the study, and we fully agree with that. Writing, according to the methodologist, is not a goal, but a means of learning, a support for memorizing words. At the initial stage, priority should be given to the number of oral exercises, which should be twice or three time as much as the proportion of written exercises. The last remark means that the author proposes the simultaneous teaching of oral and written speech, with a clear predominance of the former. Thus, we can summarize that this author unequivocally supports the principle of the centrality of spoken language.

Oral advance in teaching Chinese at the initial stage is also considered by foreign researchers T. Jen and Ping Hu [20]. Considering hieroglyphics to be the most

frustrating factor in learning Chinese, the authors suggest cancelling handwriting of hieroglyphs when teaching Chinese. They propose a rather radical approach that they believe could lead to a fundamental change in the teaching Chinese as a foreign language. Their proposal is to eliminate the requirement to write Chinese characters by hand at the initial stage of learning, since a lot of the time devoted to writing characters can be effectively spent on speaking and reading, that is, in fact, very close to the oral advance method. The methodology proposed by the authors of the article is quite interesting: oral advance with the predominance of speaking and listening is accompanied by teaching hieroglyphic reading, that is, hieroglyphs are presented to students not in the productive mode of writing hieroglyphs by hand, but in the receptive mode provided by the computer.

A study by J.L. Packard [12] presents the results of a one-year study to determine the effects of time delay when introducing Chinese characters in the elementary Chinese course. This study, which is well known in the field of Chinese as a foreign language teaching, proves that providing students with a time delay before introducing unfamiliar, non-phonetic spelling into the Chinese language curriculum is beneficial for learners and does not harm subsequent acquisition of the target language. These results support the idea that delaying before introducing characters into the curriculum is beneficial for acquiring Chinese as a second foreign language. The lack of oral progression and the introduction of hieroglyphic writing at the first stage of training distracts students from acquiring the ability to distinguish between Chinese sounds and to be fluent in colloquial speech.

To implement the communicative method of oral advance in teaching the elementary course of the Chinese language at the Sentan school, we are developing a textbook that will be complementary to the syllabus related manual of Liu Xin "The New Practical Course of the Chinese Language" [13]. To intensify the teaching of oral speech and stimulate students' communication, the manual will include additional colloquial formulas in pinyin for compiling dialogues. In addition, the introduction of hieroglyphic keys will be systematized in accordance with the topics of the main manual under study. Prescribing keys and examples of their use in hieroglyphic writing when reading is transferred to extracurricular independent work of students. Thus, at the lesson there will be additional time to consider the phonetic features of the Chinese language, mastering the tones and rules for reading pinyin. Intensive mastering of oral practice will enhance the learners' motivation and their interest in mastering the Chinese language for communication purposes.

Conclusions. In general, drawing on the theoretical works we have reviewed, we believe that oral advance at the initial stage of learning the Chinese as a foreign language is quite justified, since in the Chinese language, according to researchers, hieroglyphs, both traditional and simplified, constitute a non-phonetic form of a

written text. Since they are practically unrelated to the words they denote, they can hardly reinforce the meaning of lexical units. In addition, if we adhere to the previously discussed concept of oral advance by T. Jen and Ping Hu, we can, following them, study hieroglyphs not by writing them, but in the process of reading, as a receptive type of speech activity. This methodology combining spoken language centrality or, in other words, an oral advance method, with reading hieroglyphic texts will be more motivating for learners of Chinese.

References

1. *Shkola kitajskogo yazы`ka «Sentan» v Sankt-Peterburge*. URL: <https://www.sentan.ru>
2. Kurbakova M. A. *Sposoby` optimizacii processa obucheniya inostrannomu yazы`ku (sovremennoe primenenie psixoterapevticheskogo metoda doktora Lozanova) / M. A. Kurbakova // Yazы`k i kul`tura*. 2016. № 3. Pp. 137-145. DOI: 10.17223/19996195/35/12
3. Kitajgorodskaya G. A. *Metodika intensivnogo obucheniya inostranny`m yazы`kam: Ucheb. posobie. — 2-e izd., ispr. i dop. — M.: Vy`ssh. shk., 1986. 103 p.*
4. Kolesnikova I.L., Dolgina O.A. *Anglo-russkij terminologicheskij spravocnik po metodike prepodava`niya inostranny`x yazы`kov*. SPb.: Izd-vo «Russko-Baltijskij informacιονnyj centr „BLICz”», «Cambridge University Press», 2001. 224 p.
5. Maczkevich K. O. *Texnologiya intensivnogo obucheniya inostranny`m yazы`kam v starshix klassax srednej shkoly`*. *Lingua mobilis*, № 6 (32), 2011. Pp. 125-130.
6. Yulianova I. V. *Kul`turologicheskij potencial sodержaniya obucheniya v mladshix klassax bolgarskoj shkoly`*. *Avtoreferat diss. kand. ped. n., M., 2003. 20 s.*
7. Maslovecz O.A. *Kriterii vy`bora i sozdaniya uchebnika kitajskogo yazы`ka dlya srednej shkoly`*. *Vestnik AmGU*, №60, 2013. Pp.105-110.
8. Maslovecz, O. A. *Metodika obucheniya kitajskomu yazы`ku v srednej shkole: ucheb. posobie / O. A. Maslovecz. Blagoveshhensk: Izd-vo BGPU, 2012. 188 p.*
9. Kochergin I.V. *Ocherki metodiki obucheniya kitajskomu yazы`ku*. *Nauchnoe izdanie. M., ID «Muravej», 2000. 160 p.*
10. Demina N.A. *Metodika prepodavaniya prakticheskogo kitajskogo yazы`ka*. *Izd.2, ispr. i dop., M., Vost. Lit., 2006. 88 p.*
11. Theresa Jen, Ping Xu. *Penless Chinese character reproduction*. *Sino-Platonic Papers*. Ed. Victor H. Mair, Department of East Asian Languages and Civilizations University of Pennsylvania Philadelphia, PA. #102. 2000. URL: https://books.google.ru/books/about/Penless_Chinese_Character_Reproduction.html?id=B2NkAAAAMAAJ&redir_esc=y

12. Packard J.L. *Effects of Time Lag in the Introduction of Characters into the Chinese Language Curriculum. The Modern Language Journal*, 74, 1990. Pp. 167-175.

13. Lyu Sin` i dr. *Novy`j praktičeskij kurs kitajskogo jazy`ka. Sbornik upražnjenij. Beijing Language and Culture University Press. 2006.*

中国古代礼仪：社会行为与文化遗产的守护者
**RITUALS IN ANCIENT CHINA: GUARDIANS OF SOCIAL
BEHAVIOR AND CULTURAL HERITAGE**

Yakovleva Valeriia Vladimirovna

postgraduate

Lugansk State Academy of Culture and Arts named after

Mikhail Matusovsky

抽象的。本文深入探讨了中国古代仪式背后的哲学及其在中国文化和社会中的意义。它探讨了仪式如何深深植根于人们的日常生活中，成为社会秩序、精神联系和文化传统保存的机制。它讨论了仪式的外在方面与其内在精神本质之间的相互作用，强调和谐的概念和美德的培养。本文通过考察中国古代礼仪背后的哲学，为礼仪对中国社会的深远影响及其在当代中国的持久意义提供了宝贵的见解。

关键词：仪式、哲学、中国、文化、传统、儒家思想。

Abstract. *This article delves into the philosophy behind ancient Chinese rituals and their significance in Chinese culture and society. It explores how rituals were deeply embedded in the daily lives of the people, serving as a mechanism for social order, spiritual connection, and the preservation of cultural traditions. It discusses the interplay between the external aspects of rituals and their inner spiritual essence, emphasizing the concept of harmony and the cultivation of virtues. By examining the philosophy underlying ancient Chinese rituals, this article offers valuable insights into the profound impact of rituals on Chinese society and their enduring significance in contemporary China.*

Keywords: *ritual, philosophy, China, culture, tradition, Confucianism.*

Rituals play a significant role in the culture and philosophy of China, permeating many aspects of life, from daily activities to important events, reflecting the importance of traditions and culture. Rituals have the ability to transform human essence due to their sacred nature. The most essential function of rituals is their ordering function. Primitive people, living in an uncertain and dangerous world, sought ways to organize and create harmony in the space of chaos. As noted by the Soviet orientalist I.M. Diakonov, humans have always been aware of a certain orderliness and transitions in life processes. They observed the repetition of day

and night, the changing of seasons, the necessity of repeating labor processes, the human heartbeat, inhaling and exhaling, and other bodily functions. All these rhythmic processes were perceived as order. In ancient times, humans viewed the world as a specific order of everything that exists, expressed through repeated natural phenomena. Rituals helped establish and reinforce this order, shaping a worldview that was not independent but continued through the repetition of ancestral examples. “In the manifestations of his conscious behavior, the ‘primitive,’ archaic human is not aware of an action that has not been previously performed and experienced by someone else, and not by a human. What he does has already been done. His life is the continuous repetition of actions initiated by others” [6, p. 33].

The history of understanding ritual in China began around the 21st century BCE, and the first rituals in China emerged during the Neolithic period when people began worshiping their ancestors and nature gods. In the Chinese language, “ritual” is called “li” (Chinese traditional writing: 禮, simplified: 礼, lǐ). In modern Chinese, “li” has multiple meanings, including respect, etiquette, ritual, gift, politeness, ceremony, behavioral norm, propriety, tradition, custom, rule, and rite. This character can be found in Chinese words such as 礼物 (lǐ wù, meaning “gift” in English), 礼貌 (lǐ mào, meaning “politeness” in English), 礼仪 (lǐ yí, meaning “etiquette” in English), and so on. The character 礼 has a history of over three and a half thousand years. It can be traced back to its earliest appearance on turtle shells, although it looked slightly different at that time (see Figure 1).



Figure 1

Initially, this character depicted a ritual vessel or container. At the bottom, there is the radical 豆 (dòu), indicating that it is a vessel with a long stem. At the top, there are two jade ornaments 王 (yù), positioned inside the ritual vessel. Thus, the original form of the character “li” can be interpreted as a sacrificial vessel. During the period of inscriptions on the bronzes of the Jinwen script (金文, jīn wén), the character slightly changed its shape, but the essence remained the same.

The sacrificial ritual was the most significant, as reflected in the original form of the character. Therefore, in the evolution of the character “li,” the key “altar” (示, shì) appears on the left side of the complex character, depicted as 礻, symbolizing the act of sacrifice. Thus, the traditional Chinese character was formed. In the right part, there was an error, and one element was replaced. Instead of the jade ornaments in the vessel, 曲 (qū, meaning “song” or “melody” in English) appeared. However, this change does not alter the essential meaning of the character; rather, it complements it. As a result, in the traditional variant, the character «li» consists of three elements: sacrifice, melody, and a vessel with a long stem (see Figure 2). Chinese scholar Wang Guowei asserts in his classic work «Ciyuan» that the meaning of the character 禮 was «to place jade inside a vessel to offer sacrifices to deities.» Gradually, this character became associated with offering sacrifices to gods using alcohol and, ultimately, became a general term for denoting ritual objects [8, p. 291].

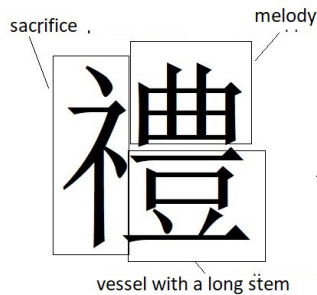


Figure 2

In simplified Chinese, 禮 transformed into 礼 while preserving its etymological meaning. Based on the analysis of the character «li,» it can be concluded that in the Chinese philosophical-mythological system of values, rituals hold special significance. They are interpreted not merely as formal procedures but as a way to show respect to ancestors, gods, and nature spirits, as well as a means to achieve harmony and balance in life. The study of the historical development and content of Chinese ritual culture and customs has become a necessary means of exploring traditional Chinese culture. Rituals in Chinese culture serve as a means of expressing identity and national pride, helping to preserve the traditions and values passed down from generation to generation.

China has always been known as the «state of rituals» or the «country of ceremonies.» The foundation of ancient Chinese religious cults and rituals was rooted in the needs of agriculture, the necessity of precise time determination, and other

factors that sparked human interest in the heavens, the earth, the air, and the forces of nature. Furthermore, a characteristic feature of ancient societies was the perception of myth and ritual as an inseparable whole, intimately connected to human life. Throughout the history of China's existence and development, the concept of «eternal return» and the cyclic nature of the universe have been prominent. In the Chinese consciousness, the present represents a repetition of archetypes. Through rituals, the Chinese repeatedly found themselves «inside the myth,» returning to the moment of the world's creation. Rituals are an element of the cosmological model of ancient China, based on the same principles of proportionality, rhythm, and harmony that govern the cosmos, society, and the world as a whole. The universal Chinese worldview assumes the existence of two worlds: the inner and the outer, and according to tradition, the inner realm is always considered true and eternal, dominating over the outer realm, which is inherently fragile and temporary.

In Chinese philosophy, the concepts of «inner» and «outer» are associated with synonyms such as «being» and «non-being.» However, in ancient Chinese language, there was no verb for «to be»; it was replaced by the verb «to have.» Thus, the discussion revolved around existence or non-existence. The term for «non-existence» in Chinese is «wu» (无, wú), which is one of the key categories of Daoism. When asked why Confucius did not speak about «wu» while Laozi continuously talked about it, a follower of Confucianism named Wang Fu said, «The perfect sage Confucius identified himself with 'wu' (non-being) and understood that it cannot be taught, so he had to speak of 'you' (有, yǒu; existence)» [5, p. 242].

Chinese philosophers believed that every object possesses both an inner and an outer aspect, with the inner part taking precedence over the outer. A distinguishing feature of Chinese culture is the recognition of the necessity of an «inner ritual» that is performed deep within the soul, giving priority to substance over form. However, the inner potential can only manifest in the external world under specific conditions. Thus, a cycle is formed where the upper point sets the rhythm of global development, and if the cycle follows this rhythm, eventually the invisible lower point will reach the upper position. The integrity of the entire universe is reflected in the manifestations of the external world, which is an element of this cycle. Therefore, the presence of the inner aspect of things implies the coexistence of the outer aspect.

One researcher of Chinese culture, V. Malyavin, asserts that ritual is a channel for the manifestation of the force of being. Ritual becomes the universal medium for existence, the fullness of the all-encompassing emptiness «xu» (虚, xū), the center of the «jian» (间, jiān) environment [4, p. 127]. As a result, Chinese philosophy possesses typical characteristics that are a result of a ritualized perception

of the world. It is important to note that questions of epistemology did not arise in Chinese philosophy. Chinese philosophers were not concerned with whether the table we see is real or illusory, whether it is an idea in our mind or occupies an objective position in space. Thinking was perceived as a real phenomenon. Consequently, problems related to the foundations of knowledge were absent, which is a characteristic feature of the ritualistic perception of the fact of cognition. In Chinese philosophy, two categories of spiritual culture, «tranquility» and «emptiness,» occupy a significant place. Tranquility, as a form of inner existence (靜, jìng), signifies the complete absence of movement and change, residing in the point of the «Great Boundary.» Everything is in a state of tranquility, representing the potential phase of new birth at a higher level, leading to perfect order. Tranquility precedes movement in the opposite direction, where the external manifestations of essence become evident.

Another form of the inner aspect is emptiness (虛, xū). Emptiness is not associated with the absence of things within space. In traditional Chinese understanding, emptiness is present in everything, but it itself is not empty because it is always «empty yet full.» Here lies true fullness and inexhaustibility. These words are supported by a quote from the Dao De Jing: «The Dao is perfectly empty, yet when utilized, it is never exhausted...» [1, p. 176].

Emptiness is always dynamic and changeable, permeating everything. In the inner chapter «A Person in the World of Humans,» the sage instructs the disciple on how to «fast with the heart»:

若一志，无听之以耳而听之以心，无听之以心而听之以气。听止于耳，心止于符。气也者，虚而待物者也。唯道集虚。虚者，心斋也。

(Ruò yīzhì, wú tīng zhī yǐ ěr ér tīng zhī yǐ xīn, wú tīng zhī yǐ xīn ér tīng zhī yǐ qì. Tīng zhǐ yú ěr, xīn zhǐ yú fú. Qì yě zhě, xū ér dài wù zhě yě. Wéi dào jí xū. Xū zhě, xīn zhāi yě).

This can be translated as: «Let your will become unified. Listen not with the ears, but with the Heart. Listen not with the Heart, but with Qi (spiritual currents). Listening stops at the ears; the Heart stops at accord. Qi is emptiness and waiting for things. Only the Dao gathers emptiness. Emptiness is the fasting of the Heart» [2, p. 14].

These concepts allow Chinese culture to perceive and understand the world with deep respect for inner potential and emptiness, which permeate all things. A vivid example is a vessel that can be useful because of its emptiness, not just because of the clay from which it is molded. The interaction between the external aspect of ritual and its inner emptiness is a complex and interdependent process. The external aspect of the ritual requires the existence of inner empty form, while the inner emptiness requires external form for its manifestation.

Thanks to Confucius and his followers, ritual gained historical merit and continued to thrive for many centuries. Confucius attributed great importance to ritu-

als and included them as part of the «six arts» that a «noble man» should master: ritual, music, archery, chariot driving, calligraphy, and mathematics. There is a legend that tells of a ruler of the Qi kingdom who neglected the ritual, and in response to this, Confucius embarked on a long journey, believing that such a violation «could lead the people to death and ruin.» The great philosopher saw in ritual not only ceremonial actions but also connected it with a sacred state of being, as rituals bestowed sanctity upon the most ordinary actions. Ritual requires participants to have a «special mindset» associated with a certain state of consciousness to establish harmonious relationships with Heaven, thus achieving the highest form of social behavior. One who fully understands and follows the ritual can transform from a «small person» into a «noble man.» Therefore, the lower a person is on the social ladder, the less ritualized their life is. Russian sinologist A.A. Maslov, in his work «China: The Bells in the Dust of a Mage and Intellectual's Wanderings,» speaks about the profound mystical foundation of any ritual – a special experience that allows a person to transition from one state to another: «Essentially, the entire Confucian ideology speaks of the careful observance of what is referred to in modern science as the ‘ritual of status change’» [3, p. 64].

Rituals in Ancient China were shrouded in mysticism, and rulers and sages acted as mediums. Magic (mysticism) was closely associated with primitive agricultural, pastoral, and artisanal techniques, as well as with stable communal, kinship, and patriarchal relationships. Confucius and Laozi sought to adapt ancient mystical beliefs to the needs of state governance, aiming to unite the roles of ruler and sage. The ritual, to some extent, deprived individuals of autonomy in judgments and actions, immersing them in the realm of the «interhuman.» Ancient Chinese ritual purified social life from randomness and served as the foundation of all human activities, as a society that does not adhere to prescribed norms and rules cannot exist and thrive. Norms and rules of life in China were established as a reflection of the will of Heaven. Violating the ritual meant severing the connection and disrupting communication between the realms, leading to an imbalance in the entire world. Confucius believed that if there was a rupture between Heaven and Earth under a ruler's reign, the only correct solution was to change the leadership. The ideal ruler, the one who always maintained harmony between Heaven and Earth, did so through rituals. Thus, another significant aspect of the ritual is the harmonization of spiritual energies in the world and the unification of all existence. Confucian proponents associated the concept of «harmony» with music, which, through the ritual, connects individuals with spirits and nature. However, over time, the ritual of that period gradually ceased to be a means of communicating with the gods and became an end in itself. During this period, ritual actions acquired the characteristics that define the modern understanding of ritual: a complex stylized system of actions, gestures, and words expressing specific cultural values. Ritual remained

the foundation of the worldview in ancient societies, but the distance between the sacred world and the world of ordinary people steadily increased.

Chinese philosophy primarily emerged from ritual affirmation rather than from questions, conflicts, or problems. Furthermore, it is important to note the particular suggestibility of Chinese art and the style of expression employed by Chinese philosophers. The statements and texts of Chinese philosophers were often not clearly formulated, and their suggestiveness was nearly boundless, which is natural for ritual where essence is conveyed through suggestion rather than explicit articulation.

In ancient China, rituals were associated with various ceremonies and formalized the philosophical-cultural content of human behavior and consciousness expressed in behavioral norms. Chinese scholar Li Anzhai believes that «li» (礼) encompasses both material and spiritual aspects and represents a holistic culture in anthropological terms. Folk customs, traditions, the will of the people, systems, rituals, decrees, and other elements are all part of the ritual.

Therefore, throughout the history of China, rituals have played a crucial role in the complex mechanism of preserving and reproducing social behavior, acting as regulators of stable life in China and preserving religious customs in the collective consciousness. In all Chinese religions, ritual becomes part of everyday faith. It permeates so deeply into national cultures and people's consciousness that many previously closed rituals become part of everyday practice. The culture of traditional Chinese rituals consists of a combination of etiquette, ceremonies, behavioral norms, and customs that have been passed down from generation to generation over a long historical period and do not fade away with time. Their durability and inheritance are rooted in society and culture. Although some rituals may temporarily disappear under the influence of politics and circumstances, they are revived when they find fertile ground. The preservation of rituals in China today is an important task of the state as they help to maintain cultural heritage and reinforce values that are passed down from generation to generation. Thus, rituals continue to play a significant role in human life, and their observance is a sign of respect for China's traditions and cultural values.

References

1. Laozi. *The Book of the Way and Virtue (Daodejing)*. Compiled, translated, prefaced, and commented by I.I. Semenenko. Moscow: TERRA-Book Club, 2008. 528 p.
2. Malavin, V.V. Zhuangzi. Laozi. Moscow: Mysl, 1995. 440 p.
3. Maslov, A.A. *China: Bells in the Dust of the Magician and Intellectual's Wanderings*. Moscow: Aleteya, 2005. 376 p.

4. Rowley, J. *Principles of Chinese Painting. Translation and afterword by V.V. Malavin. Moscow: Nauka, 1989. p. 127.*
5. Feng Youlan. *A Brief History of Chinese Philosophy. Translated by R.V. Kotenko, edited by E.A. Torchynov. St. Petersburg: Eurasia, 1998. 376 p., 242 p.*
6. Eliade, M. *Cosmos and History. Moscow: Moscow, 1987. p. 313.*
7. 李安宅 (2005) 《仪礼》与《礼记》之社会学的研究. 上海: 上海人民出版社, 5
8. 王国维. 观堂集林. 北京: 中华书局, 1959年. 第一册. 1233页, 291

G. F. 戈贝尔游记中的克里米亚现实 «REISE IN DIE STEPPEN DES SÜDLICHEN
RUSSLANDS»

**THE REALITIES OF THE CRIMEA IN THE TRAVELOGUE
OF G. F. GOEBEL «REISE IN DIE STEPPEN DES SÜDLICHEN
RUSSLANDS»**

Krygin Roman Vyacheslavovich

Lecturer

*The Crimean Engineering and Pedagogical University
named after Fevzi Yakubov*

注解。 本文讨论了 19 世纪克里米亚现实问题。 分析阐明了“现实”一词本身作为语言学、文化研究、民族志的研究对象； 并在 G.F. 的科学工作中揭示了 19 世纪克里米亚半岛固有的现实。 戈贝尔。

关键词：克里米亚、地名、戈贝尔、游记。

Annotation. *The article deals with the issue of the Crimean realities of the 19th century. The analysis clarifies the term “reality” itself as an object of research in linguistics, cultural studies, ethnography; and also reveals what realities are inherent in the Crimean Peninsula of the 19th century in the scientific work of G.F. Goebel.*

Keywords: *Crimea, toponym, Goebel, travelogue.*

Постановка проблемы. For foreigners, the Crimean Peninsula in the 19th century becomes a “showcase of Russian culture.” Many of the travelers visited the Crimean peninsula in order to note the positive and negative sides of the Russian state, as well as its influence on Crimea.

Since 1783, the Tauride province has become popular in historical and linguistic descriptions. The most important role in the presentation of Crimea in the West was played by European travelers, including German-speaking ones. Dozens of foreigners have visited the Crimea, who have left descriptions of their trips (travelogues, travel notes, as well as research papers) related to various genres and having different scientific and artistic value. [6]

Изложение основного материала. Realities are part of a large and important problem of transferring national and historical identity. For the first time, the realities began to be explored in the early 50s. [2] So, N. Sobolev uses the term

“reality” in 1952. G.V. Chernov also writes about realities, who mainly uses the term “non-equivalent vocabulary”, and A.E. Suprun considers realities as “exotic vocabulary” [6]. According to S. Vlahov and S. Florin realities are words and so-called “nominative phrases” that name objects characteristic of the life (everyday life, culture, social and historical development) of one people and alien to another. [2] The purpose of the article is to identify the mentioned toponyms of the Crimea in F. Goebbel’s travelogue, as well as to systematize them. The scientific method used when writing an article is analysis.

Friedemann Traugot Goebel is a German chemist, naturalist who visited the Crimea in the XIX century. The result of the trip is a scientific travelogue “Reise in die Steppen des südlichen Russlands” (Russian Journey through the steppes of southern Russia). The purpose of the trip is to study the chemical composition of the Crimean lakes. The traveler expects to study table salt, epsomite and Glauber’s salt. Goebel already in the preface of the book emphasizes that Russia and Crimea, in particular, are insufficiently explored.

In his travelogue, the author emphasizes the multiculturalism of people who visited the Crimean peninsula, because on board, in addition to the German, there were Italians and Greeks. [4]

The greatest number of realities mentioned in Goebel’s work will be geographical realities. These include – the Black Sea coast (*Tschernomirische Küste*); Yeni Kale Fortress (*Jenikale*), which according to the author was built partly by the Genoese, and partly by the Turks. Before going from Kerch to other Crimean cities, Goebel stops at a small hotel called “Hotel der Paris”. The traveler emphasizes the quality of this hotel and speaks of it as “the best in the Crimea” (*der beste Gasthof der Krym*); Feodosia or Kaffa (*Theodosia oder Kaffa*). Gebel notes the fact that at the time when the city was ruled by the Genoese, it was densely populated, fortified, and was also such a “prosperous” city that it received the name “Crimea-Is-tanbul” (or Constantinople of Crimea).

Later, the fortifications of the city were destroyed. (*Als die Genuesser im Besitz desselben waren, war er stark bevölkert, befestigt und so blühend, dass er den Namen Krim-Stambul (Konstantinopel der Krym) erhielt. Später wurden seine Mauern und festen Schlösser zerstört.*) [4]; In Old Crimea (*Staroi-Krim, die alte Krim*) the author notes that this settlement is located in a “beautiful valley”, whose “ruins clearly show the former wealth of the state that existed here.” (Before, Gebel met mostly only steppes without trees and occasionally Crimean Tatar “villages”.); In the city of Sudak (*Sudagh*), the author notes one of the wine gardens that attracted him. Later, having traveled all over the Crimea, he notes that he could not find such a beautiful wine garden in the rest of the peninsula; the author speaks of the city of Karasubazar (*Karassu-bazar*) as a large and densely populated city. (*Karassu-bazar ist groß und bevölkert*). According to the traveler, the city

is rich in religious buildings. So, the author writes: “There is a Russian church, Greek, Catholic, Armenian Catholic and 22 mosques, a large number of towers and one synagogue in Karasubazar” (*In Karassu-bazar gibt es Russische Kirche, Katholische, Armenisch-Katholische und 22 Moscheen und mehrere Thürmen und eine Synagoge*) [4]. The houses of the residents of this city are small and built in the Crimean Tatar manner (*Die Häuser sind klein und von Tatarischer Bauart*). It is also noted that the city acts as the main market for the sale of local products. Plums - “the juiciest” Pears - “magnificent”, grapes, watermelons, melons, according to Goebel, are the most delicious here, and the prices are the lowest (*Karasubasar bildet den Hauptmarkt für inländische Produkte. Reinekloden, Pflaumen, die saftigsten Birnen, die herrlichen Trauben, Arbusen und Melonen waren hier die leckersten und die Preisen die niedrigsten*). Alushta (*Alouschta*), which the author also calls a „Tatar place“ (*der tataren Ort*), Simferopol (*Sympheropol*), Sevastopol (*Sewastopol*), Balaklava (*Balaklawaw*), Demerdzhi mountain ranges (*Demirdzchi-Felsen*), Chatyr-dag (*Taschtirdagh*), Ayu-dag (*Ayou-Dagh*), Chufut-Kale (*Tschoufut-Kale*), which, according to the author, is inhabited by Karaites, Evpatoria or Kozlov (*Eupatoria oder Koslow*), Saki (*Saak*) [4].

Of the rivers, the following should be noted: Biyuk-Karasu River (*der große Karassu, Schwarzwasser*) it is referred to in the travelogue simply as “Big Karassu”, the Tunas River (*Bach Tunas*), Churuk-Su River (*Djuruk-Su*); Goebel also describes Siwash (*Siwasch*), which the author adapts to German as “faules Meer”. This lake is located in the west of the Sea of Azov and separates the Crimean Peninsula from the mainland. The author notes that “almost from a distance of one verst, Siwash spreads a rotten smell” (*fast gegen eine Werste Siwasch faulen Geruch vebreitetete*) [4].

Villages: Kizilovka (*Kisilowka*), Ayan (*Aian*), Kuchuk-Yankoy (*Koutschuk-Yankoi*), Biyuk-Yankoy (*Bojouk-Yankoi*) and the Tatar settlement Kurklet (*Kourklet*) [4].

Of the personalities, the following should be distinguished: Major General Bergman (*der Generalmajor von Bergmann*) – the commandant of the Yenikale fortress, with whom Gebel managed to meet in person; Timkovsky (*der Stadthalte von Kertsch Timkowski*) – manager of the city of Kerch; Lambro Kachonni (*Katschoni*) – a figure of the Greek national liberation movement against the Turkish yoke. South of the city of Karasubazar, according to Hegel, there is a palace built for the Empress and at the time of writing his travelogue belongs to this figure; Borozdin (*Borosdin*) – officer and governor-General of the Tauride province, owner of one of the Yalta residences. Goebel also mentions another German traveler, namely Friedrich Parrott, calling him his “colleague” Goebel writes: “There is no significant difference in height between the Black Sea and the Caspian Sea” [4].

It is worth noting the realities of public life, which was mentioned by the author in his work, namely, Tschernomorts (*Tschernomorzen*) – the social group to which the Cossacks who inhabited the Black Sea coast belong. Goebel emphasizes that “he has not met more polite people in all of Russia”. (*Übrigens habe ich nirgends in Russland größere Höflichkeit getroffen, als bei Tschernomorzen, alle, denen man begegnete, grüßten höflich*) and a market called “Taouchan-Basar”, which is located at the foot of Chatyr-Dag Mountain near Alushta. [4]

Conclusions.

The interest in the Crimea among travelers in the XIX century was of a different nature. Friedemann Goebel visited Crimea to determine the chemical composition of the Crimean lake and motivated his trip by a lack of knowledge about the peninsula. The traveler notes the diversity of the nations that were with him during his trip to the Crimea. This author also emphasizes this in the city of Feodosia, where Russians, Germans, Tatars, Greeks, Armenians, Jews and Karaites live. This feature of the Crimea is also observed in the number of different religious buildings.

References and sources

1. Верещагин Е.М., Костомаров В.Г. Язык и культура / Е.М. Верещагин. Изд. 2-3, Москва, 1976. - 27 с.
2. Влахов С., Флорин С. Непереваемое в переводе / С. Флорин «Международные отношения», Москва, 1980. – 343 с.
3. Гебель. Ф. Путешествие по степям южной России. Thel I / Fr. Goebel; C. Claus, A. Bergmann. – Dorpat: Im Verlage bei C.A. Kluge, 1837 – 5 с.
4. Соболев Л.Н. Пособие по переводу с русского языка на французский. / Л.Н. Соболев, Издание на иностранных языках, 1952, – 282 с.
5. Супрун А.Е. Экзотическая лексика, А.Е. Супрун. М: ФН, 1958. – 231 с.
6. Храпунов И.Н. «Восток в Европе»: Крым после присоединения к Российской империи глазами иностранцев. / И.Н. Храпунов, 2018 УДК 910.4 – 3

使用人为因素管理技术确保领土在不断变化的地缘政治和地缘经济条件下可持续发展的方法论

**METHODOLOGICAL APPROACHES TO THE USE OF
HUMAN FACTOR MANAGEMENT TECHNOLOGIES TO
ENSURE SUSTAINABLE DEVELOPMENT OF TERRITORIES
IN CHANGING GEOPOLITICAL AND GEO-ECONOMIC
CONDITIONS**

Kurochkin Pavel Aleksandrovich

JSC «NIPIGAS», Moscow, Russia

Batumcki Vyacheslav Yurievich

Sakhalin Youth Resource Center, Yuzhno-Sakhalinsk, Russia

注解。 在地缘政治和地缘经济不断变化的情况下,人的因素是俄罗斯领土可持续发展的重要条件。 确保领土发展并考虑到复杂的负面影响的需要决定了采用技术来管理人为因素对活动各个方面的影响的工作的相关性。

关键词: 人为因素、管理、领土可持续发展、混合战争、信息战、冲击技术。

Annotation. *The human factor is an important condition for the sustainable development of Russian territories in the situation of continuous geopolitical and geo-economic changes. The need to ensure the development of territories taking into account the complex negative impact determines the relevance of the work on the adaptation of technologies for managing the impact of the human factor on various aspects of activity.*

Keywords: *human factor, management, sustainable development of territories, hybrid warfare, information warfare, impact technologies.*

Modern geopolitical and geo-economic conditions: peculiarities and trends. Modern geopolitical and geo-economic conditions of existence of Russia as a whole, its regions and territories, are defined as a hybrid war of a group of states (countries of the “collective West”) against Russia. The term “hybrid war” fully characterises both the current state of affairs and the logic of their development.

The concept of “hybrid war” is quite new - it was first formulated in 2001 by British authors Knox and Murray in the work “Dynamics of Military Revolutions” [1].

The fundamental theoretical and methodological basis on which the “hybrid warfare” approach is built are the developments of the Russian foreign military

theorist Eugene Eduardovich Messner (1960). E.E. Messner served as chief of staff in one of Baron V.P. Wrangel's divisions, was an active participant of military operations (wounded 7 times), received 12 military awards. He refused to be Ukrainianised in Odessa.

He immigrated to Belgrade, then to Argentina. He was a convinced anti-communist and expressed sympathy for the National Socialists. But despite all this, he remained a highly professional military theorist.

In 1960 in Buenos Aires (Argentina), E.E. Messner published a book "Rebellion - the name of the Third World War", in which he writes: "In previous wars, the important honoured the conquest of territory. Henceforth, the most important will be the conquest of souls in the warring state. Wars will be fought not on a two-dimensional surface, as in the old days, not in three-dimensional space, as it was at the time of the birth of military aviation, but in four dimensions, where the psyche of the warring peoples is the fourth dimension. ... Warfare by insurgents, saboteurs, terrorists, saboteurs, propagandists will take on enormous dimensions in the future." [2].

The founder of the modern understanding of "hybrid warfare", its theorist, is considered to be Frank Hoffner - a US citizen, former Assistant Secretary of Defence of the United States in 2005-2007, who in his articles developed theories of deterrence of geopolitical opponents, using the term "hybrid confrontation" [3].

In fact, it was F. Hoffner in his work "Military Confrontation in the 21st Century: The Rise of Hybrid Warfare" (2007) who was the first modern researcher to present a systemic picture of hybrid warfare, which, in his opinion, consists of seven elements: conventional warfare, guerrilla actions and cyber warfare, combined with aggressive information support, diplomatic pressure, legislative support and interference in the political structure of threatened societies. F. Hoffman's elements of hybrid confrontation can be defined as the basic forms of hybrid warfare. The technology of application of these forms was defined by F. Hoffman as "vague accusations and historical distortions" (the basic forms are combined depending on the circumstances and objectives) [3].

Then, the US Army Chief of Staff (2011), a NATO official document (2014) and the US Army Joint Command report (2015) enriched the concept of "hybrid warfare" by supplementing it with a combination of traditional irregular methods: calls for terrorist acts, indiscriminate violence, use of criminals and covert operations [4,5].

Following this, the European Hybrid Threat Centre in 2017 included four more groups of methods in the hybrid warfare toolkit: flexible and rapid response to facts and events in conflicts, use of media and social media for propaganda, fake news sites to broadcast false stories, and recognised the equivalence of three different theatres of war (conventional battlefield, conflict zone populations, international community) [6,7,8].

The 15 components of influence listed above now form the basis of the Western concept of hybrid warfare (Table 1).

Table 1
Stages of development of the “Western” concept of “hybrid warfare”

The stage of development of the theory of «hybrid warfare»	Authors	Main tools
Stage 1 «Development of basic forms of warfare»	Frank Hoffman (2007)	1. Conventional warfare 2. Guerrilla action 3. Cyber warfare 4. aggressive information supply 5. Diplomatic pressure 6. Legislative support 7. Interference in the political structure
Stage 2. «Developing the capabilities of traditional and irregular methods»	US Army (2011, 2015) NATO (2014)	8. Terrorist acts 9. Indiscriminate violence 10. Criminal 11. covert operations
Stage 3. «Improving the approach.»	The European Center of Excellence for Countering Hybrid Threats (2017)	12. Flexible and rapid response to facts and events in conflicts 13. Media and social media propaganda 14. Internet pages for broadcasting «false» stories 15. Equality of the three theatres of war (conventional battlefield, populations in conflict zones, international community)

It should be remembered that in the modern Western concept, the main goal of hybrid warfare is destruction (of a country, state, political system, order, stability, etc.), i.e. hybrid warfare can only end with the destruction of one of the parties to the confrontation.

An important part of hybrid warfare is information warfare, which is aimed at information and psychological impact, leading to distortion of perception of the existing reality and inadequate perception of the enemy and its capabilities [6,7].

The result of information warfare is determined by the loss of ideological attitudes, the formation of false ideologies and the development of severe psychophysiological conditions in as many people as possible (creation of conflicts, development of protest activity, transformation of conflicts, formation of total protest) [6,7].

Forces and means used in information warfare include all factors of influence on a person:

- informational factor (communicative impact);
- organisational factor (includes the action of mass media using the tools of propaganda and social advertising, actions of special units of the armed forces, as well as actions of certain state structures and organisations)
- The corporate factor (includes the actions of corporate forces that pursue certain political and economic goals due to competition).

The target of this complex impact is each individual. The object of influence is: cognitive sphere (the impact affects the ability to learn, analyse experience, draw conclusions and on this basis to form knowledge, skills and abilities); health, personal and business qualities of a person (especially - the sphere of his motives) [8].

Under these conditions, the study of opportunities to counteract the complex negative impact, adaptation of technologies for managing the influence of the human factor on various aspects of activity in order to ensure sustainable development of territories is of scientific interest and is relevant.

Technologies and methods of negative impact. One of the main targets of negative impact on people and society is the area of social values. The values prevailing in the mass consciousness are the fundamental factor of social stability. They determine the choice of social alternatives by society. The mechanism of influence of public values is well described in the works of M. Weber, for example, he writes: “it is not interests (material and ideal), not ideas that directly dominate human behaviour, but “pictures of the world”, which are created by “ideas”. They are like arrows, very often determined the paths along which the dynamics of interests moved further human action” [9].

“Ideas” in the definition of M. Weber are values and beliefs that form “pictures of the world” and determine the behaviour of people, determine the forms and ways of implementation of their interests.

Values are everything that has significance for a person, is the object of his attitude and evaluation - these are judgements and evaluations concerning ourselves, other people and any phenomena of the surrounding world [10].

Beliefs give a personal assessment of these or those objects, connections and relations, determine the meaning that people put into them. They connect the phenomena of the external and internal world with our values and experiences. And beliefs play a leading role in determining the emotional reaction of a person, the formation and change of values. So, for example, if a person is persuaded that an inherent value, for example, social justice, is utopian, it blocks his desire to fight for social justice and will gradually lead to its devaluation and exclusion from the value field.

The system of social values and beliefs is built hierarchically and on a certain foundation, which is formed by a number of system-forming values. By destroying or changing them it is possible to transform the whole value world of a person or, at least, the way he perceives reality and his behaviour.

The most developed technology of influence for the purpose of transformation of value attitudes is the technology of “thought-viruses” [11]. [11]. Thought-viruses are beliefs that limit our perception of the world, thinking and actions. P. Dietls notes: “Thought-viruses can infect thinking and the nervous system in much the same way that physical viruses infect the body or a computer virus infects a computer system, causing confusion and impaired function. Just as the software base of a single computer or an entire network can be destroyed by a single virus, so the human nervous system can be ‘infected’ and destroyed by thought-viruses” [10,11]. The use of thought-virus technology can lead to the death of a single person as well as large masses of people [11], historical examples of this are “holy wars”, ideas of “world supremacy”, ideas of “the peculiarity of one nation, the superiority of its interests over all others”. The spread of thought-viruses is carried out together with other technologies of influence and is aimed at the development of personal and group egoism, weakening of integration ties, industrial and other separatism, creating the basis for mass total protest.

An effective technology of negative impact (information warfare) is the technology of conflict transformation, which is widely used in the practice of organising “colour” revolutions [12]. The author of the approach is Jimmy Sharp, an employee of the US CIA, a talented psychiatrist.

Examples of the results of the technology application are:

- events that resulted in the separation of the Baltic republics from the USSR (self-determination of the Baltic republics);
- the events that accompanied the break-up of Yugoslavia;
- changes in the Arab world, Central and Central Asia.

J. Sharp offers practical methods that allow any conflict, even an interpersonal one, to be transformed into any situation of protest. The basis of the action is as follows: in a situation when a person experiences difficulties, when he has to solve problems (in various areas of his life) - he begins to look for someone to blame, to ask the question “who is to blame?”. By influencing a person at the level of manipulation of his consciousness it is possible to “turn around” the situation of any conflict, to direct the active activity of a person to counteract the one who in this situation will be presented as guilty [12].

Human perception at this moment does not go through the system of volitional factors, not through the system of consciousness work, but through the emotional-reflex level in the system of feelings and actions. This is what determines the perception to which the person will be pointed. This is one of the fundamental laws of the work of the human psyche (the law of nature).

An important element of the technology of “conflict transformation” is the creation of a traumatic situation for the population of the country or group of people in relation to whom the impact is being made. Any situation (dissatisfaction

with the work of public utilities, etc.) can be used as an informational occasion for these purposes, especially effective for this purpose are situations of terrorism or numerous injections of inaccurate information.

An important and widely known technology of influence is the “Overton window”, developed by Joseph Overton - a lawyer from the United States, who formulated it as a concept defining the admissibility and acceptability of public statements on a particular topic. After his death, the concept was further developed by the American neoconservative Joshua Treviño [13]. This technology allows a person to accept unacceptable actions, values and motives as a factor of ordinary existence, and to build a system of ordinary actions that leads to developmental stoppage, cognitive disorders, and, by and large, degeneration and destruction of life. The technology of “overton window” makes it possible to make the destructive factor ordinary.

Another effective technology used in modern geopolitical and geo-economic conditions of hybrid warfare is the technology of addiction development, which allows to form a person’s dependence on a certain activity, a certain drug, etc. Dependence is an effective tool to influence a person because it cannot be cured - it can only be transformed based on certain interests.

Summarising the intermediate results, it can be noted that the target of negative influence is a human being in all its manifestations. The targets here are cognitive activity (ability to analyse experience, learn, form knowledge, skills and abilities), personal and business qualities - people’s motivation, their ability to take responsibility, to achieve the necessary results in labour and social work of a certain level of complexity under existing conditions. All the listed targets represent the components of the concept of “human factor”.

Human factor, its characteristics. The concept of human factor, its characteristics and peculiarities of their management in the process of labour activity organisation in the conditions of implementation of large investment construction projects are described in works [14,15,16]. Table 2 lists the main characteristics of the human factor.

Table 2.

Main characteristics of the human factor and tools for managing their influence on the labour behaviour of employees

Human factors components	Characteristics of human factors components
Qualification - determines a person's ability to perform actions (e.g. labour - work) of a certain level of complexity and make decisions in a certain area of activity. It represents a set of general and specialised training, practical skills and abilities required to perform certain actions of a certain complexity	Knowledge - acquired and accumulated in the process of independent cognition of the world, as well as organised learning (general, professional) in various forms
	Understanding determines a person's ability to use the necessary set and volume of knowledge in the process of solving production tasks (determines the ability to create images of objects, actions and their results)
	Ability - the capacity to perform a specific operation using consistent internal regulation and control. consistent internal regulation and control
	Skill - an achieved and brought to automaticity ability to perform conscious actions in the process of performing social or labour duties
Quality of activity (quality of fulfilment of labour or social duties) - determines the ability of a person to perform actions (e.g. work) of a certain level of complexity under certain conditions	Awareness - reliable knowledge of a person or a group of people (e.g. labour collective, public organisation) about the actual state of the object
	Powers characterise the rights delegated to a person to perform certain actions (labour or social duties) and use resources
	Responsibility is characterised by the need to fulfil the powers assigned to a person (by his social position, status, position, etc.) as the right to perform duties and use resources for its realisation
Personal qualities of a person - characterise his/her ability to perform certain actions (social or labour duties), his/her compliance with the requirements of his/her position, occupied social position (status), etc.	Motivation - a set of internal and external driving forces that motivate a person to labour activity and give this activity a direction oriented towards achieving certain goals
	Culture - the combination of a certain level of human development and abilities, expressed, including in the conditions created and actions performed by a person.
	Health - determines whether a person has certain functions and qualities that directly or indirectly condition the fulfilment of his/her work duties

Components of the human factor are targets of negative impact in the current geopolitical and geo-economic conditions of hybrid confrontation between a group of unfriendly states and Russia, the ultimate goal of which is the destruc-

tion of the state, country, and economic stability of society. Ensuring sustainable development of territories in the existing conditions has the character of counteraction to the negative impact and requires the development of approaches and practices of human factor management.

The main methods of human factor impact management: principles and concept of methodological approach. The authors have carried out work on adapting the methodology of human factor influence management on labour activity, extending the theoretical and methodological approach in general to human activity [16]. Table 3 presents the scheme of the human factor management model adapted for use in the process of ensuring sustainable development of territories.

Table 3
Scheme of the human factor management model to ensure sustainable development of territories

Management stage	Measures for the management of human factors
1. Planning - setting target parameters	1.1 Planning - setting target parameters of socio-economic development of territories: - formation of requirements for activity (including labour and social, corporate, yen) - defining parameters of acceptable risk level (in accordance with selected indicators in comparison with selected benchmarks, etc.) 1.2 Planning of target parameters of human factor characteristics ensuring acceptable level of risk in the process of planned socio-economic development
2. Assessment	2.1 Assessment of actual parameters of socio-economic development: - collection of data for assessment; - assessment of factors and conditions 2.2 Assessment of actual characteristics of the human factor: - assessment of actual qualifications (by sectors and organisations, public associations) - assessment of compliance with authority and responsibility, quality of fulfilment of labour and public duties
3. Adjustment of actual parameters of human factor characteristics to target parameters	3.1 Identify the actual characteristics of the human factor that have a negative impact on socio-economic development indicators 3.2 Determination of adequate ways to bring the identified characteristics to target values 3.3 Elimination of inconsistencies - carrying out work to change the identified characteristics (implementation of a set of measures in accordance with the selected risk management strategy) 3.4 Confirmation of achievement of target values of human factor characteristics parameters 3.5 Implementation of the development process with acceptable risk 3.5.

The main areas of work and methodological approaches to human factor management. Table 4 provides a description of the main areas of work on human factor management to ensure sustainable development of territories.

Table 4

Main areas of work on human factor management to ensure sustainable development of territories.

Line of work	Description
Use of the language and peculiarities of communication of the population of the territory	In order to form an unambiguous understanding of development goals (avoiding double meanings), to form a «result image» on this basis, and to plan actions, it is necessary to «be one’s own» - to use the language spoken by the population, to take into account the peculiarities of communication and interaction (including inter-ethnic, inter-confessional, corporate, etc.) when constructing conversations and media materials
Ensuring a high quality of public information	In the work carried out, it is necessary to highlight general, possibly universal values, the achievement of which in specific conditions is possible through modifying one’s behaviour, adopting values, following rules (individual health, professional development, protection of the fatherland, career growth, growth of wealth - earnings, etc.). An important role in this work is played by modern mass media (pages and publishers of authorities / regional and federal media in social networks, etc.).
Targeting rumours (whispering propaganda)	In order to manage the human factor, it is necessary to actively use socio-psychological algorithms of information dissemination - purposefully form and disseminate certain information at the level of rumours. Rumour dissemination does not require costs and has a «viral» character. For example, about consideration of issues of encouragement, rewarding employees of organisations for safe work, rewarding employees for activity on elimination of unsafe working conditions, etc. The main thing is that part of such rumours should be confirmed (to some extent) in practice. It is also important that the information is conveyed natively, i.e. does not cause a sense of intent.
Targeted work with satire (caricatures, anecdotes, etc.)	Targeted work with satire, jokes, anecdotes, understandable for the population of a particular territory, region, reflecting the specifics of their interaction and aimed at maintaining the necessary behaviour (in order not to be funny) is an effective tool for managing the human factor. The forms of such work can be (and are) satirical numbers and concerts (including youth - CCR, student spring, etc.), articles, publications and dissemination of satirical and humorous information in the media.

Line of work	Description
Targeted work with values and beliefs	This area of work is relevant in any region and for any territory (especially in multi-ethnic and multi-confessional regions). The confessional agenda (religious and national holidays, geography and time of their celebration) fix certain meanings and values (even more effective than modern education systems)

Table 5 summarises the main practical approaches to human factor management.

Table 5
Main Practical Approaches in Human Factor Management Work

Practical approaches	Description
Forming a personal emotional attachment to the situation (achievement, victory, tragedy) and the necessary and required actions in the existing conditions	The work is aimed at forming positive emotional attachment to situations of labour or military exploits, memorable historical dates, events of regional or federal level (commissioning of an industrial or social facility, restoration of an enterprise, achievements of young people, etc.). Also, within the framework of this direction the work on formation of a negative image of events, phenomena or assessments in relation to events, phenomena or positions, restraining, hindering the development of territories. For example, at the enterprise level: work to form a negative image of a violator of safety requirements (based on the employees' understanding that the violator hinders them in achieving their goals - creates difficulties in obtaining material motivation (bonuses), his actions may have a negative impact on all employees of the organisation (in the limit - up to health damage or death).
Signal unity	Human factor management on a territorial scale and for the purposes of their sustainable development is aimed at excluding (or minimising) different understanding of the goals facing the territory, region, as well as excluding ambiguous assessment of required and expected actions. The unity of the broadcasted signal allows a person to act intuitively (without thinking) in specific, existing in the present conditions. It is also a tool for preventing negative rumours. It is necessary to involve any public formations and opinion leaders of working collectives (for example, among believers - religious leaders, elders, etc.) in the work on the formation of a unified signal.
Visual agitation and satire	The use of humour and satire is based on an appeal to the archetype of the population groups of a region or territory. The method is based on the formation of a visual image - a caricature, a caricature, distributed in traditional and new media (including but not limited to social networks, messengers, including regional media - newspapers, magazines, online news publications, etc.).

Practical approaches	Description
System of work with ambassadors, campaigners	Informing and campaigning is a pervasive system of influence realised by people (ambassadors, campaigners, etc.). Ambassadors have the opportunity to talk on equal terms with workers and, in the course of such conversations, to relate the issues discussed to the position and situation in which both the ambassadors and workers are at the same time. This recommendation is widespread and mandatory

Conclusion. The article considers the issues of adaptation and use of human factor management technologies in the work to ensure sustainable development of territories in changing geopolitical and geo-economic conditions. The authors have analysed the current trends of geopolitical and geo-economic changes, characterised by the term “hybrid confrontation”, considered the technologies of directed negative impact, aimed at deterring and, eventually, destroying society, state, country, socio-economic stability. The target of the negative impact of the technologies used is a person, more precisely - the main characteristics of his/her personality (cognitive activity, qualification and competence, health and motivation, personal and business qualities) - everything that is defined in the aggregate by the term “human factor”. Based on the conducted research, the authors show the possibility of adapting the methodology and technologies of human factor management, developed and adapted in the process of managing the implementation of large investment construction projects, to the situations of ensuring sustainable development of territories in today’s changing geopolitical and geo-economic conditions. The data obtained allow us to conclude that, in general, the approach proposed by the authors shows its effectiveness. Systemic work on human factor management allows to effectively manage large groups of people living in a certain territory, significantly differing from each other in terms of education and professional training, attitude to various requirements and their compliance, motivation for safe labour, etc., and also allows to create a kind of cultural environment of the territory, in which self-control mechanisms begin to operate.

The authors will continue to work on the development, implementation and evaluation of the effectiveness of new (innovative) tools of human factor management, as well as the assessment of their effectiveness.

References

1. MacGregor Knox, Williamson Murray. *The Dynamics of Military Revolution, 1300-2050*. Cambridge University Press, 2001. – 205 p.
2. Messner E.E. *Mutiny, or the name of the Third World War. World without peace*. [Text] / E.Э. Месснер. – Пенрум, 2022. – 188 p.
3. Frank G. Hoffman. *Conflict in the 21-th Century: the Rise of Hybrid Wars*. Arlington, VA: Potomac Institute for Policy Studies, December 2007 [Electronic resource]. URL: www.potomacinstitute.org/images/stories/publications/potomac_hybridwar_0108.pdf (accessed: 26.05.2022).
4. Hybrid war — does it even exist? URL: NATO Review magazine [Electronic resource]. URL: <http://www.nato.int/docu/Review/2015/Also-in-2015/hybrid-modern-future-warfare-russia-ukraine/EN/> (accessed: 30.05.2022).
5. *The US Army Operating Concept (AOC): Win in a Complex World 2020-2040*. 7 October 2014 [Electronic resource]. URL: <http://www.tradoc.army.mil/tpubs/pams/TP525-3-1.pdf> (accessed: 27.06.2022).
6. Gerasimov V.V. *New Challenges Require Rethinking the Forms and Methods of Combat Operations // Military-Industrial Courier* [Electronic resource]. URL: <http://vpk-news.ru/articles/14632> (date of access: 15/05/2017).
7. Gerasimov V.V. *The value of science in foresight*. [Text] / V.V. Gerasimov. - *Voenno-Industrial Courier*. - № 8 (476) - 2013.
8. Sanginov N.N. *“Hybrid wars” and their impact on the national security of the Republic of Tajikistan*. Dissertation for the degree of candidate of political sciences. [Text] /N. N. Sanginov. – Center for Strategic Research under the President of the Republic of Tajikistan. – 2020.
9. Weber M. *Gesammelte Aufsätze zur Religiobnssoziologie*. – Bd. 1. – Tubigen, 1986. – S. 252.
10. Dilts R. *The tricks of language. Changing beliefs with NLP*. [Текст] / R. Dilts – St.P.: Publishing house Piter, 2001. – p. 112.
11. Pugachev, V.P. *Technologies of hidden management in modern politics*. [Text] / V.P. Pugachev // *Politics. State. Management: Collection of articles*. – M.: PH BHU, 2014. – pp. 197-235.
12. Sharp G. *From Dictatorship to Democracy: A conceptual framework for Liberation* [Text] / G. Sharp // translated from English by N. Kozlovskaya. - Moscow: New Publishing House, 2005 - 84 p.
13. *Technology of destruction. Overton Window* [electronic resource] <https://nstarikov.ru/blog/36349> (date of access: 11/02/2021)
14. Kurochkin P.A. *Methody metody vzaimodeistviya v izuchenii v izdel'stvennykh riska* [Methods of taking into account the influence of human factor in production risk management]. - *Gas industry*. - №10 - 2019. - pp. 126-133.

15. Kurochkin, P.A. *Using methods and means of propaganda and social advertising in the work on the formation of safe work culture (by the example of construction organisations) [Text] / A.I. Agoshkov, P.A. Kurochkin, D.D. Pakhomov // Society and Civilization - vol. 4. - № 2. - 2022. - pp. 36-47.*

16. Kurochkin, P.A. *Continuous training of employees of construction organisations as an effective method of change management in the process of implementation of investment construction projects [Text] / A.I. Agoshkov, P.A. Kurochkin // Effective change management in society, politics, economy / edited by Dr. econ. sciences, prof. M.A. Osipova. - SPb. - Publishing house SPbSEU, 2021. - pp. 122-146.*

现阶段青少年人生成功的特点
**FEATURES OF THE LIFE SUCCESS OF YOUNG PEOPLE AT THE
PRESENT STAGE**

Mukhanova Irina Fedorovna

*Candidate of Psychological Sciences, Associate Professor
Donetsk National Medical University n.a. M.Gorky*

注解。 文章给出了“人生成功”概念的合理性，思考了人生成功的标准和因素。从叙事心理学的基本规定的角度来分析成功。实证研究结果揭示了现阶段学生青年人生成功感知的主要特征，揭示了青年成功的类型。

关键词：成功、人生成功、人生成功因素、叙事心理学、学生青年、成功人格。

***Annotation.** The article gives the justification of the concept “life success”, considers the criteria and factors of life success. Success is analysed from the point of view of the basic provisions of narrative psychology. The results of the empirical research reveal the main features of student youth’s perception of life success at the present stage, and the types of youth success are revealed.*

***Keywords:** success, life success, factors of life success, narrative psychology, student youth, successful personality.*

Globalisation of the world economy, domestic political situation in the country, transformation of the basic structures of modern society, dynamics of habitat renewal inevitably lead to changes in the mechanisms of personal life activity. The old models, according to which a person acted earlier, do not always work in the new environment, therefore, there is a need to adapt to new models of behaviour, which, ultimately, requires the renewal of views, opinions, values of the individual. Thus, transformations in society are naturally reflected in such socio-cultural phenomenon as life success. It becomes relevant to study the essential characteristics of personal life success, to identify the content, contradictions of formation and trends of change in the perceptions of success in different social groups.

Success is a multidimensional, interesting object for scientific comprehension, which is associated with human activity and is impossible without its activity expressed through the act of creation, achievement or conquest, then many psychologists and philosophers have investigated its nature. Among them are K.A. Abul Khanova-Slavskaya, L.I. Antsiferova, A. Atkinson, V.V. Babushkin, L. Witt-

genstein, G.V. Hegel, R. Descartes, A.I. Dementius, E.A. Klimov, I.S. Kohn, K. Levin, V.A. Lektorsky, D. McClelland, M.M. Mamardashvili, T.I. Oizerman, G. Allport, P. Ricker. Allport, P. Riker, N.V. Rosenberg, V.M. Rozov, V.P. Serkin, V.S. Stepin, D.N. Uznadze, L. Festinger, J. Habermas, M. Heidegger, W. Hoppe, N. Yuknat, K.G. Jung and others.

Basically, the problematics of success was considered in acmeology - performance (life) is defined in terms of achieving social significance, in sociology (V.V. Grishin), in philosophy (N.V. Rosenberg, V.V. Babushkin), in psychology (K. Levin - in the context of the problem of goal-oriented learning), in psychology (K. Levin - in the context of the problem of goal-oriented learning). Levin - in the context of the problem of personality goal-setting, and more specifically - the connection with the study of the level of pretensions; F. Hoppe, N. Yuknat - the role of success and failure in a particular activity, the dependence of the dynamics of activity on the presence or absence of success, the connection of success with pretensions, difficulty of tasks, self-esteem (the level of "I") of the individual; L. Festinger showed the dependence of the experience of success and failure in a particular activity. Festinger showed the dependence of the experience of success or failure on the zone of task difficulty and the internal zone of human capabilities; A. Atkinson and D. McClelland - in the theory of achievement motivation; L.V. Borozdina - the level of claims; V.F. Petrenko, E.V. Libina - analysis of the perception of the image of a successful person; G.V. Trubetskaja, A.S. Spivakovskaya - the phenomenon of fear of success; E.Y. Artemyeva, V.F. Petrenko, V.V. Petukhov, A.O. Prokhorov, V.P. Serkin, M.A. Kholodnaya, A.G. Shmelev - the psychosemantic approach to the study of the image sphere of personality.

The life success of a personality can be considered in the system of two major factors - external (socially conditioned) and internal (personally conditioned). It should be noted that in everyday life the first factor is favoured, i.e. success is considered as the achievement of certain socially acceptable goals, production, career, educational, etc. results. In S.I. Ozhegov's Dictionary of the Russian Language [2] success is interpreted through the concept of luck, although the latter assumes the randomness, spontaneity of achieving certain results, their external conditionality and does not require any special efforts from the individual, not to mention serious internal work aimed at personal growth, personal self-improvement, leading to certain effective results.

However, focusing only on external factors, on socially acceptable criteria of life success often, as shown in the works of K. Horney [4], leads to neurotization of personality, its dissatisfaction with life, especially in the case of impossibility to achieve socially approved goals. In our opinion, speaking about the life success of a person, it is necessary to focus on internal factors, on the subjective feeling of successfully living life, regardless of its external effects, but rather focusing on the internal, subjective satisfaction with life.

It can be argued that the realisation of the meaning of one's life is an important initial prerequisite for the life success of an adult. And here the question arises, how a person can evaluate the life lived, by what criteria to determine its quality, including success. In our opinion, the answer to this question can be found by referring to the main provisions of narrative psychology, which treats life as an integral, unique personal work, as a narrative text.

Narrative psychology proceeds from the understanding of personality as self-narrative and, accordingly, personal experience as the result of ordering, organising life events into narrative texts. Hence, it can be assumed that telling life and living it are one and the same phenomenon in their essence. This approach implies an appeal to the notion of authorship - of life, its history, and, finally, fate. The authorship of actions, opinions, interpretations, statements, and, finally, of life in general, is one of the characteristic features of modern culture, which presupposes the attitude to self-development, personal growth, and autonomy in statements and actions.

Narrative is a transformation of disordered life events into a certain sequence, built on the basis of the general life concept of the narrator or his personal myth, which determines the internal logic of the generated text. The consequence of this is the creation of the individual's own inner world, his own reality, built as a unique personal work with the help of the author's attitude both to the surrounding reality and to his own personality and identity.

Narrative is an expression of the intersection of individual and social poles of human life, allowing one to build one's own biography, one's own destiny on the basis of comprehension of socio-cultural experience, correlating it with personal experience. Narrative patterns of structuring life experience become life patterns, according to which not only stories but also people's actions are structured.

In our opinion, one of the steps to a successful life is to realise oneself as its creator, which implies the creation of one's own consistent life story. In this case, the personality is interpreted as a creator, author of his/her own life, as an active self-determining subject with its own internal content, as well as the ability to interact with the surrounding world, allowing this content to unfold.

Thus, life success can be viewed as the author's participation of the individual in supporting and strengthening his/her integrity, searching for a new system-forming basis, a new meaning of life. In this case, one of the key characteristics of a successful personality is the ability to manage its meaning space. It is about the ability to rethink and restructure one's life experience in connection with changing life circumstances, as well as in accordance of personal narrative with one's life plans, tasks and prospects.

Moreover, the most important role here is played by the ways of semiotic mediation and regulation of life activity mastered by the personality, carried out

through narrative practices, which allow to comprehend, conceptualise the events taking place, building with the help of these processes one's own mental reality, creating one's own life project, the project of the Self.

Based on the provisions noted above, we conducted a study aimed at determining the specifics of young people's perceptions of life success, identifying personality typologies regarding the achievement of success, as well as studying the hierarchy of the definition of success for today's youth. 330 students aged 17-22 took part in the study.

It is known that any typology is rather conditional, as it does not reflect the whole variety of socio-psychological characteristics of the object. However, it should be noted that the development of typologies makes it possible to draw a systematic picture of the phenomenon under study and solve methodological problems.

The conducted empirical study allowed us to determine the typology of student youth perceptions of life success on two bases: subjective assessment of life success and activity in achieving success, taking into account the acquired knowledge and life experience [1].

The majority of young people attributed themselves to the real-active successful type (52%) - these are those who are active by nature, open to new things, constantly deepens their knowledge in accordance with the requirements of time and professional activity and achieves success in professional activity and everyday life.

22 % of students referred themselves to the potential-active unsuccessful type - these are those who consider themselves an educated person, possess certain knowledge and experience, are competent in certain activities, strive to deepen knowledge in the near future, but have not yet achieved success in professional activities and everyday life.

The forced-active successful type was classified by 21, 5 % of the student youth - these are those who are forced to constantly deepen knowledge and gain experience in accordance with circumstances, are able to achieve success in accordance with life situations, their professional activity, etc.

Thus, the results of self-assessment of success indicate that for student youth at the present stage the most typical is a real-active successful personality type. It follows that if a person does not evaluate himself as successful, his success may be in doubt. In case the personality feels successful, the awareness of its ability and competence in managing its own life activity, solving life difficulties, and realising its goals increases. In other words, a successful personality realises his/her self-efficacy.

Interesting results were obtained when studying the understanding of the very definition of success, the main essential characteristics of life success in the perceptions of young people. The following hierarchy was found:

- Success is the achievement of the set goal (79 %).
- Success is satisfaction with one's own life (75 %).
- Success is when you are satisfied with yourself (68%).
- Success is the state of happiness from realising your goals (67 %).
- Success is when you are always moving forward: from goal to goal and you enjoy it (64%).
- Success is well-being in the family (60 %).
- Success is career growth (58.5 %).
- Success is material prosperity (54,8 %).
- Success is a prestigious job and financial independence (54.5 %).
- Success is an opportunity for self-realisation (52.1 %).
- Success is winning (40.9 %).
- Success is an opportunity to have more free time (17,9 %).
- Success is a positive evaluation of your activity by other people (16,1 %).
- Success is striving for superiority in everything (15,2 %).

These results allow us to conclude that student youth are characterised by orientation to internal factors of life success, to the subjective feeling of a successfully lived life, regardless of its external effects, but rather by orientation to internal, subjective satisfaction with life. Success in the perceptions of student youth is characterised by the dominance of such criteria of life success as achievement of the set goal, satisfaction with one's life and oneself, a state of happiness from the implementation of one's goals, moving forward from goal to goal, well-being in the family, career growth, material wealth, and the possibility of self-fulfilment.

Also, the concept of success can be considered in a narrow and broad sense. The narrow meaning is reduced to the understanding of the assessment of a specific result, achievement, significance for the individual. In a broad sense, students understand success as life success, which a person achieves and experiences in the course of his or her own life activity, striving to realise his or her own potential.

If we paraphrase the words of S.L. Rubinstein [3] that a person is a person only when he/she has his/her own history, then a successful person is one who has built his/her own history in the form of a consistent integral personal work, reflecting the life experience interpreted, comprehended and accepted by the person.

The above allows us to conclude that in modern psychological science there is a significant number of concepts of life success of a personality. The constant increased attention of scientists, methodologists, and practitioners of psychology to this problem is also due to the fact that further development of the problem of personal life success requires specification, clarification, systematisation and generalisation of the basic concepts of this category.

References

1. *Gorodnyak, I. Modern personality types regarding the achievement of success* / I. Gorodnyak // *Social Psychology*. 2008. Vol. 32. № 6. p. 43-48.
2. *Ozhegov, S.I. Dictionary of the Russian language* / S.I. Ozhegov; ed. by Prof. N.Y. Shvedova. - Moscow: Russian language, 1982. - 816 p.
3. *Rubinstein S.L. Fundamentals of general psychology*. SPb., 2004. 713 p.
4. *Horney K. The Neurotic Personality of Our Time*. Norton. 1937. 299 p.

DOI 10.34660/INF.2023.20.30.102

人类组合能力的功能遗传方面
FUNCTIONAL-GENETIC ASPECT OF HUMAN COMBINATORIAL ABILITIES

Katkova Elena Nikolaevna

*Candidate of Psychological Sciences, Associate Professor
Amur Humanitarian and Pedagogical State University, Russia*

注解。 本文从功能遗传学角度对心理学中的组合能力问题提供了理论理解。 作者坚持采用系统的方法来证实组合能力的本质。 描述了组合能力的功能遗传机制以及社会遗传机制。 人们注意到这样一个事实，即在科学中，人的组合能力的起源问题尚未得到充分发展，特别是需要在专门组织的组合活动中部署的自然机制的潜在组成部分很少得到体现。 提出的立场是，组合能力的实现是根据环境的要求在个体发生上发生的。 作者的结论是，个体成为组合活动的主体，通过矛盾而获得一定的人格特质，影响其组合的成功，这就是人的组合能力的体现和发展。

关键词：组合能力、功能系统、心理机制、活动主体、人格、自然能力、认知。

Annotation. *The article provides a theoretical understanding of the problem of combinatorial abilities in psychological science from the point of view of the functional-genetic aspect. The author adheres to a systematic approach in substantiating the nature of combinatorial abilities. The functional-genetic mechanisms of combinatorial abilities along with the social-genetic mechanisms are described. Attention is drawn to the fact that in science the question of the origin of combinatorial abilities of a person is poorly developed, in particular, the potential component of natural mechanisms that need to be deployed in a specially organized combinatorial activity is poorly represented. The position is put forward that the actualization of combinatorial abilities occurs ontogenetically in accordance with the requirements of the environment. The author concludes that an individual, becoming the subject of combinatorial activity, through contradictions acquires certain personality traits that affect his success in combining, this is how combinatorial abilities of a person manifest and develop.*

Keywords: *combinatorial abilities, functional systems, mental mechanisms, subject of activity, personality, natural abilities, cognition.*

Formulation of the problem

World psychology has a rich baggage of research on the problem of the psychology of human abilities. In our opinion, one cannot agree with the opinion of some representatives of modern psychological science that the psychology of abilities ceased to exist in the 20th century in the form of scientific psychology and that this problem can be found only in theories of personality and in variants of the decomposition of intelligence into subcomponents (T. Leahy, [7]).

The fact that such a different meaning is put into the concept of abilities cannot be considered accidental or explained by a subjective approach. It testifies to the objective complexity of the very structure of abilities and therefore the analysis of their different forms. Abilities are considered not as ready-made, but as developing formations, which serves as a methodological basis for dividing them into potential and actual ones. [3]. In this regard, the general abilities of a person, from the potential side, are a kind of genetic software product contained in the biological structure of the brain, and from the actual side of development, abilities appear, are realized only in activity, and are lost outside activity, therefore, the methodological principle of understanding the essence of ability should be the unity of consciousness and activity (S.L. Rubinshtein, [8]).

The methodological principles of Russian psychology require the following approaches to the problem of abilities: 1) disclosure of the role of social conditions as the material basis for the emergence and development of human abilities; 2) the study of abilities as a developing process; 3) taking into account in the development of abilities not only the role of social conditions, but also the natural potentials of the individual himself [1].

The human psyche, consciousness is characterized by three central categories of psychology “reflection”, “activity”, “activity”, as well as the mechanism of interaction of these phenomena. Reflection (the highest form of the psyche) arises during the development of a special type of interaction that connects a person with the world and is mediated by connections with other people. This type of interaction, called activity, on the one hand, is the main form of realization of a person’s active attitude to reality, and on the other hand, it generates new, ever higher levels of activity [9].

If abilities are considered as developing formations, then in order to identify the connection between micro- and macro-development of a person, the connection between the functioning of the psyche and the socio-genetic program of its development is important, since it is at the stage of functioning that prerequisites and opportunities arise for moving to a higher level. Microdevelopment (functional) - associated with the assimilation of individual actions, concepts, functional changes in the psyche that occur within the same age, not leading to a restructuring of the personality as a whole (horizontal, intra-level shifts). Macrodevelopment

(age-related) - characterized by more general personality changes, a new plan for reflecting reality, a transition to new types of activity (vertical shifts) [4].

The socio-genetic aspect is reflected in the framework of the cultural-historical theory of L.S. Vygotsky (abilities as generic qualities of a person), in the theory of activity of A.N. Leontiev (ontogenesis of abilities as a process of appropriation or mastery, the formation of abilities in a person's individual life) [6].

The importance of the principle of determinism in considering the psychology of abilities is emphasized by A.V. Brushlinsky, he says that the humanistic nature of human psychology is due to the fundamental laws of his psyche. They are generalized, first of all, by the principle of determinism, which overcomes the one-sidedness of materialism (being determines consciousness) and idealism (consciousness, in general, the mental determines being): it is not being and not the mental that determine the life of a person and the course of history in general, but the subject, people who are inside being and possessing a psyche, consciously and unconsciously create history in the process of their activity. They cognize and transform reality, revealing and using its patterns, seeking to identify and overcome their delusions. The psyche is non-material, it exists as the most important quality of the subject (by no means purely spiritual). Soul, spirit, spirituality is not a supra-psyche formation, but different properties and levels of the psyche. The psychology of abilities is inextricably linked with spirituality (not reducible to religiosity) [2].

Rubinshtein S.L. noted the inadmissibility of separating abilities from common "generic" properties inherent in all people. Rightly believing that abilities manifest themselves and develop in activity, B.M. Teplov believed that they do not exist before activity. Then the question remains open, from what they arise and develop. This contradiction is removed in the concepts of E.P. Ilyin, V.D. Shadrikov. Based on the theory of P.K. Anokhin on the functional system, L.S. Vygotsky on development, and B.G. Ananiev on the structure of mental functions, as well as data on neuropsychology, they assume an understanding of abilities as properties of functional systems. In conclusion of the methodological analysis of approaches to the problem of abilities, I would like to quote E.P. Ilyin's statement that "there are no people without any ability, but there are people with low abilities, who, with their qualitative (comparative!) Evaluation, are called incapable, i.e. those who do not have the ability to achieve a high result in something" [5].

Author's position

In our article, we set the task of theoretically considering the psychology of combinatorial abilities from the point of view of the functional-genetic aspect, which is affected in the framework of a systematic approach. As a system, we consider operating mechanisms in the structure of combinatorial abilities, controlled by regulatory and motivational mechanisms, which generally ensure the success

of the subject in solving combinatorial problems in the conditions of a specific activity.

Abilities have a complex structure that reflects the systemic organization of the brain, interfunctional connections and the activity nature of mental functions. Rubinshtein S. L. wrote that the question of the connection between mental activity and the mental properties of a person is one of the fundamental questions of psychological theory. Only through the connection of the mental properties of a person with his activity opens the way for their formation. The ability of psychology itself to contribute to the formation of people's abilities most of all depends on the correct solution of this particular issue. Considering the structure of abilities, S. L. Rubinshtein distinguishes two main components: 1) "operational" - a well-functioning system of those modes of action through which activities are carried out; 2) "core" - mental processes that regulate operations: the quality of the processes of analysis and synthesis [8].

The development of abilities occurs in two directions: 1) adaptation of individual abilities to the system of activity, their integration; 2) adaptation of individual abilities to the objective world, to the requirements of reality, i.e., "ascent" to specific, particular manifestations of general abilities. The development of abilities is carried out in the unity of these two aspects [10].

Based on the position of L. S. Vygotsky that the development of higher mental functions proceeds through the mastery of the subject's own behavioral processes and the main position of the concept of cognitive abilities of V. D. Shadrikov that the structure of abilities includes functional and operational mechanisms, we concretize them in the theoretical development and study of the structure of general combinatorial abilities, through the analysis of their operating mechanisms. The mastery of operational mechanisms enables the subject to master combinatorial abilities.

There is no clear definition of "combinatorial abilities" in the literature, the same-root words and phrases are also used: "combination", "combinatorics", "combinatorial activity", "ability to combine", "combinatorial property of the intellect", "combinatorial thinking", "combination", "recombination", "search-combination", "combinatorial task", "combinatorial actions", "constructive-combinatorial activity". We believe that the combinatorism of the psyche is a process of intelligence integration, since a number of cognitive processes are integrated in the structure of higher mental functions, which reveal themselves systematically in increasingly complex combinations throughout ontogenesis.

In our study, we defined combinatorial abilities as the ability of a person to generate new ideas and solutions based on genetically determined functional systems of the psyche that implement the function of building, completing and modifying objects in real and ideal forms, as well as on the basis of a combination of

existing knowledge, experience and skills (education, life experience, subjective attitude, etc.). The essence of the developing, multi-level functional system of combinatorial abilities is the interaction of cognitive mental processes (perception, imagination and thinking), in the conditions of solving combinatorial tasks by the subject. At the same time, the subject does not acquire fundamentally new modes of action, but acquires fundamentally new information about internal and external relations in the system.

The theoretical analysis of the problem allowed us to formulate the structure of combinatorial abilities from the point of view of the functional genetic aspect (Figure 1). In our opinion, in general combinatorial abilities, operational mechanisms (OM) are formed in the form of operational actions aimed at processing the material for the purpose of cognition. Operating mechanisms (OM) exist along with functional mechanisms (FM), they constitute complex systems of combinatorial actions. Functional mechanisms (FM) exist only in connection with the accumulation of individual experience through the formation, differentiation and generalization of conditional connections, in which the training of functions is carried out. Thus, a certain set of different-level ontogenetic properties of a person, genotypically determined, forms the basis of the functional mechanisms (FM) of combinatorial abilities.

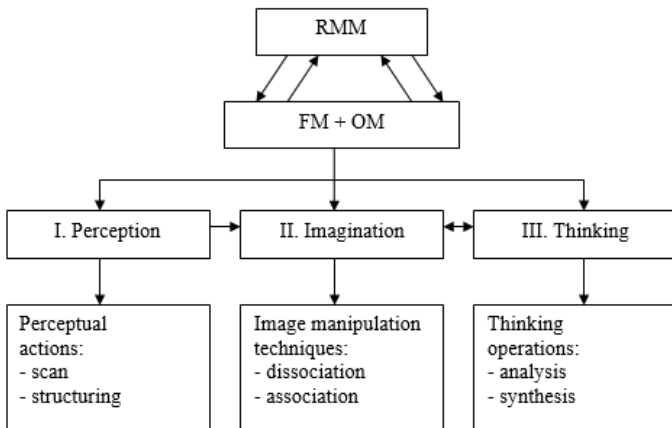


Figure 1. The structure of general combinatorial abilities.

Regulatory-motivational mechanisms (RMM) of combinatorial abilities develop from external regulation (volitional and emotional components) to internal self-regulation, which is a consequence of the development of the FM and OM system. The PMM includes the following actions: indicative, controlling, correc-

tive; decision-making and evaluation systems. The purpose of the functioning of a self-regulating system of combinatorial abilities (ACS) is beyond the interaction of perception, imagination and thinking. Subsequently, it becomes a property of personality.

Since thinking as the highest mental function, in our opinion, is the core of combinatorial abilities, we can say that the entire operational composition of combinatorial abilities has an analytic-synthetic character. Even S.L. Rubinshtein pointed out that analysis and synthesis, the common denominators of the entire process of cognition, relate not only to thinking, but also to sensory cognition and perception [8]. Thus, mental actions, on the one hand, control practical actions, and on the other hand, they are built and developed based on these actions.

Let us consider in more detail the content of general combinatorial actions. Thus, scanning based on analysis implies the movements of receptor apparatuses that perform a cognitive function. Here, the detection of different elements of the object and the selection of one or a small number of elements as informative. These are the activities involved in the processes of image formation. Synthesis-based structuring involves abbreviated hand and eye movements. These actions involve simultaneous coverage of objects that are within the reach of the receptor apparatus. Structuring involves dividing an integral object into parts, combining the main parts, or highlighting the main and secondary, establishing links between them. The specificity of the interaction of perceptual operations is determined by the formulation of the perceptual problem. Structuring is the result of learning, the result of the subsequent reduction of perceptual movements. Thus, they represent instantaneous recognition of what is already known. They perform the functions of image building, measurement, control and correction.

Dissociation or decomposition (based on analysis) - the allocation of individual aspects, details through the decomposition of the image into separate elements of its sensual structure with subsequent transformations, transformation. Dissociation consists of the following operations: hyperbolization (exaggeration), understatement, accentuation (emphasis on any features). Association or integration (based on synthesis) - combining the received elements into a new image using various methods of operating with elements. This includes the following operations performed with images: agglutination (gluing, joining changed, transformed elements of the original images); schematization (smoothing differences between objects and identifying similarities between them); typification (singling out the essential, repeating in homogeneous phenomena and embodying it in a specific image); recombination (a fantastic combination of original images, not the way they met in experience).

Analysis is the division of an object, mental and practical, into its constituent elements with their subsequent comparison. Synthesis is the construction of a

whole from analytically given parts. Deep penetration into the essence of things requires the disclosure of their internal connections, patterns and essential properties. It is done through analysis and synthesis.

We have identified a number of common features that characterize the operational mechanism (OM) of combinatorial abilities.

1) The presence of combinatorics of direct manual influences on an object or on its elements.

2) The presence of combinatorics of mental analysis of the internal interactions of elements in the system of the object.

3) The presence of universal knowledge and ideas about the interactions of the surrounding world (physical, cognitive and social).

4) The presence of a combined hypothesis about the interactions of various combinations of elements within an object and between objects.

5) The desire of the subject to organize the interaction of the objects or their elements that are of interest to him.

6) The process of cognition, construction or transformation of an object stimulates the generation of an original and unique solution to a combinatorial problem.

Shadrikov V. D. noted that the content side of abilities is the knowledge of the subject about the objective world, and their subjective experience by the subject. Summarizing the above, we believe that combinatorial actions go through several stages of development:

Stage I - the development of combinatorial actions as a natural ability, which consists in the subject's need for visual and symbolic combination.

Stage II - comprehension of the results of combination, the subject selects a specific set of actions for the intended combination of elements.

Stage III - the purposeful creative nature of combinatorial actions that are subject to the implementation of the best result.

We concluded that the driving forces for the development of combinatorial abilities are related to the contradictions between the requirements of activity and life, and the inability to fulfill these requirements at the current level of combinatorial abilities. Contradictions are resolved through activity and are born through activity. Based on the functional-genetic mechanism of the psyche, in ontogenesis, an individual, becoming the subject of combinatorial activity, through contradictions acquires certain personality traits that affect his success in combining, thus developing his combinatorial abilities.

References

1. Artemyeva T. I. *Methodological aspect of the problem of abilities*. - M., 1977. - 183 p.
2. Brushlinsky A. V. *Humanism of psychological science // Psychological journal*. Volume 21. - No. 3. - 2000. - P. 43 - 48.
3. Gubanov N.I., Tsaregorodtsev G.I. *Biological and social determination of abilities (methodological aspects) // Philosophical sciences*. - No. 2. - 1988. - P. 23 - 35.
4. Zaporozhets A.V. *Selected psychological works: In 2 vols. T.I. Mental development of the child*. - M., 1986. - 320 p.
5. Ilyin E.P. *Differential psychophysiology*. - St. Petersburg, 2001. - 464p. - P. 27.
6. Leontiev A.N. *Teaching about the environment in the pedagogical works of L.S. Vygotsky (critical study) // Psychological science and education*. - No. 1. - 1998. - P. 5 - 21.
7. *Psychological encyclopedia. 2nd ed. / Ed. R. Corsini, A. Auerbach*. - St. Petersburg, 2003. - 1096 p. - P. 690
8. Rubinshtein S.L. *Fundamentals of general psychology*. - St. Petersburg, 1999. - 720 p.
9. Smirnov S.D. *Psychology of the image: the problem of the activity of mental reflection*. - M., 1985. - 230 p.
10. Shadrikov V.D. *Psychology of human activity and abilities*. - M., 1996. - 320 p.

DOI 10.34660/INF.2023.22.65.103

伟大的丝绸之路作为经济和跨文化互动的表达：历史与现代
**GREAT SILK ROAD AS AN EXPRESSION OF ECONOMICAL AND
INTERCULTURAL INTERACTION: HISTORY AND MODERNITY**

Kozlova Anna Aleksandrovna

Candidate of Historical Sciences, Associate Professor

Kozlova Alla Vladimirovna

student

*The Siberian State Automobile and Highway University,
Omsk, Russia*

抽象的。 文章讨论了丝绸之路联盟成员国之间贸易、经济、文化、教育和科学关系的发展，特别强调了俄罗斯与中国的关系。 目前，越来越多的发展各种形式的东西方关系的项目与这条贸易路线的复兴联系在一起，其中一些项目实际上是在重复中世纪的历史和中世纪历史，另一些则提出了现代化项目， 考虑到参与国的科学和经济发展水平。

关键词：伟大丝绸之路、俄中联盟、跨文化互动、国际合作、运输物流。

Abstract. *The article discusses the development of trade and economic, cultural, educational and scientific relations among the countries that are members of the Silk Road Alliance, with particular emphasis on Russian-Chinese ties. At present, a growing number of projects for the development of various forms of East-West relations are linked to the revival of this trade route, some of them literally repeating the historical and medieval history of the Middle Ages, Others propose modernized projects, taking into account the level of scientific and economic development of the participating countries.*

Keywords: *Great silk road, Russian-Chinese alliance, intercultural interaction, international cooperation, transport logistics.*

The West and the East are different civilizations, with different ideals, values, and bases of existence, but between countries, there have periodically arisen relations of different levels and degrees of stability: from military conflicts (Alexander the Great, Genghis Khan) before relatively regular trade and cultural exchange. One of the manifestations of the second type of contact was the formation of the Great Silk Road. The term appeared quite late, in the 19th century, thanks to the German geographer and historian, founder of geomorphology Ferdinand

von Richthofen, who devoted a lot of attention to the study of Central Asia and the work «China» drew the attention of readers to the rather close trade and cultural ties between Europe and Asia. Back in the Roman Empire. SHP is a trade route from China to Central Asia and the Mediterranean, the main purpose of which was to export valuable silk fabrics and famous oriental spices for sale in many countries of the world. It was laid in the II century B.C., left the Chinese province of Xi'an, and then its southern branch went to the Kazakh steppes and the states of Central Asia, and the northern - through India, Persia in the Mediterranean. The West and East trade routes were connected by the WEP, but it should be noted that it formed not only trade but also cultural relations. This was due to the need to form infrastructure along the entire caravan route, serving both Western and Eastern merchants, which presupposed knowledge of the everyday habits of representatives of different peoples. It was thanks to the trade between East and West that Europe learned not only the charms of Chinese silk, but also gunpowder and paper, and there is no doubt that paper played a significant role in European culture [1]. It should be mentioned the travelers who had the opportunity to visit and explore distant unknown countries using the Silk Route, it was they who made maps and descriptions of various peoples with the characteristics of everyday life and culture, which, in turn, contributed to the development of geography, ethnography, and international economy in Western countries.

In the 16th and 17th centuries, the Great Silk Road began to lose its importance, as the Ottoman Empire began to play a special role, and with the development of the age of geographical discoveries, the countries of Europe began to make more active use of the sea routes, which are economically much more profitable.

But in 1991 EU countries again turned to this trade route and recognized it as one of the most important. The development of development programs for the countries of the South Caucasus and Central Asia has begun. Various proposals had been made, including the establishment of an international Europe-Caucasus-Asia transport route, which provided countries through which it would have special opportunities since it was obvious that a specialized infrastructure had been established. Of course, such contacts would affect not only the economic sphere but also the cultural sphere, the integration of science and education. But Europeans were primarily interested in Caspian and Caucasian oil, which they wanted to get around Russia. In 1997, the U.S. took an active interest in the region by adopting the program «Silk Road Strategy 97», while the Americans did not hesitate to provide free hydrocarbon exports from the region. Construction of the Baku-Tbilisi-Akhalkalaki-Kars railway began in 2007. As a result, economic and cultural contacts intensified in the region. The road passed through Turkey, Georgia, and Azerbaijan, with a total length of more than eight hundred kilometers. But even though the road was officially opened in 2017, transportation of passengers

is not carried out so far, although the project was supported by both the US and the European Union, and Switzerland pledged to supply specialized cars of special comfort.

Another new Silk Road tried to recreate by using the railways of China, Mongolia, Russia, Belarus, Poland, and Germany. Through these countries, goods enter the seaports of Sweden and Finland, and from there they are shipped throughout the Western world. This makes it possible to integrate the countries of the East more fully into the world trading system [2].

Nowadays, with China's globalization and growing economic influence in the world, such projects are increasingly being set up, as the interest in China as an economically, culturally, and scientifically advanced eastern center is beyond question by scientists, economists, orientalist, and even ordinary tourists.

The history of economic relations between Russia and China goes back more than 20 years. On 16 July 2001, the countries concluded a treaty on good neighborliness, friendship, and cooperation, consisting of 25 articles of varying scope. Its provisions refer to a trusted partnership focusing on joint strategic development, including transport, finance, science, culture and trade, and economy.

It is worth noting that Russian-Chinese relations have great potential [3]. Since the beginning of 2010, China has been one of Russia's largest trading partners, while China ranks only 16th in terms of its share in international trade relations. Yet China's investment in various sectors has ranged from \$1.8 billion to \$14 billion per year over the years and is projected to grow.

If we consider the structure of Russian exports to China, it should be noted that the main part (more than 60%) are mineral fuels, including oil and petroleum products. In second place is wood and its products (almost 9.5%), then non-ferrous metals, fish and seafood, chemical products, etc. In turn, the People's Republic of China imports into Russia machines and the latest equipment, clothing and textiles, various industrial products, etc.

In the context of the constantly changing foreign policy situation, countries have discovered new ways of cooperation. The latest technologies for the development of online commerce, electronic payments, distance education, etc. [4]

Russia and China pay considerable attention to intercultural interaction, actively supporting student exchange programs. For example, there is a university Alliance «Silk Road», which involved many countries such as Singapore, South Korea, Thailand, Turkey, Kazakhstan, and, of course, Russia. It is a non-profit organization that aims to ensure openness and international cooperation in higher education. By the way, its creation was initiated by the Xi'an Jiaotong University of Transport, also known as Xi'an Jiaotong University, together with the local government of Shaanxi Province in May 2015. At the moment, 86 universities from 26 countries and regions are involved in the program, which is already an impressive result achieved in a relatively short time.

In recent years, cooperation between China and the Russian Federation has become closer. Countries are moving to joint development and the introduction of the best of them into production. There is a development of interaction in the sphere of science, technology, and innovation, as well as transport and civil engineering. Unfortunately, some promising projects have been frozen due to the difficult economic situation. These include the world's first cross-border cableway connecting the Amur Region and Heilongjiang Province. While on the part of China the construction was almost completed, the Russian side by the end of 2021 had completed the concreting of the terminal's foundation, the station support sprawl and the terminal's vertical foundation structures, the backfilling, Concretize the distribution plate and begin reinforcing and concreting the cable car pylon [5]. By the end of the project, the number of passengers crossing the border will reach almost a million, which will contribute to the development of tourism and cultural diffusion.

Transport projects under development also include the Altai railway to China. Since 2019, the construction of the expressway from Russia to China will significantly reduce the infrastructure load on the Trans-Siberian Railway and the Baikal-Amur Railway. The construction of the expressway from Russia to China will reduce the infrastructure load on the Trans-Siberian Railway. This will also contribute to the growth of freight transport due to the shortening of the transport arm.

There are currently three main lines. According to preliminary forecasts of experts, the implementation of the project is estimated at hundreds of billion rubles. Significant costs are a deterrent, as is the protest of residents. Altai is the ecological capital of Russia. On the territory of the republic, there are many protected areas, cultural heritage objects, and UNESCO World Natural Heritage Sites. In addition, construction will be complicated by the mountainous landscape and severe environmental constraints. And it is worth noting that the Republic of Altai still has no railways at all, the nearest station is almost 100 km from the region. Although the need for a railway line to Gorno-Altai had been discussed several times before, the project was considered unprofitable. This led to the revision of the original route through the Biysk station of the West Siberian Railway and the Aveitina station. The length of the line would be about 1,000 km.

Two other variants originate in Tashtagol, Kemerovo oblast (length of about 1,081 km, of which 781 km in Russia), and from Abaza station in Khakassia (1,276 km). The project connecting Biysk and Urumqi was also considered, but later abandoned. And various ways of solving the problem are being considered: from the construction of a tunnel to the design of an overpass. Of course, such a large-scale project entails inevitable risks, but the expected results are worth it. Eastern coal exports are estimated to increase by 30%. Coal will be exported from large deposits in Western and Eastern Siberia (Kuzbass, Khakassia, Novosibirsk

region). Additional earnings will amount to almost 3 billion dollars. In addition, it will allow exporting of 30 million tons of cargo per year. The new branch will create a shorter, and most importantly - direct way of export of goods from Russia to China. This will contribute to the improvement of trade and transport cooperation with the northwestern and northern parts of China. In the meantime, despite the obvious advantages of the project, it was decided to postpone its implementation until 2025.

In addition to this project, the management of the Russian Railways is considering a variant of the high-speed highway «Eurasia», also passing through the Republic of Altai. The length of the Beijing-Moscow-Berlin line could be about 9,447 km (of which 2,366 km are in Russia). The value of the Russian site was estimated at 3.58 trillion rubles. The first segment of the highway will be the Moscow-Kazan road, which is being designed by a Russian-Chinese consortium. The commissioning was originally planned for 2023, but no specific forecasts are given. This project can become not only a link in the highway itself, but also provide an interface of the Eurasian Economic Union with the Chinese project «Economic Belt of the Silk Road».

As a result, it will be possible to create the largest network of high-speed and high-speed traffic longer than 50 thousand km, combining the transport systems of the countries of Asia, Russia, and the European Union. According to Russian calculations, the potential cargo flow by 2030 maybe 6.4 million tons, and in 2050 about 12.3 million tons. In addition, the high-speed railway will significantly reduce the travel time on the railway between the capitals of Russia and China by more than 4 times. It is estimated to decrease from 132 to 32 hours. This will create favorable conditions for the organization of stable passenger traffic and high-income freight. The main goods will be consumer goods with high added value, such as electronics and household appliances, clothing and footwear, pharmaceuticals, etc.

The new road also requires rolling stock. At the moment there are considered variants of trains with the possibility of changing the gauge and speeding up to 400 km/h. In addition, they should be equipped with various security, radio, and electricity systems. First of all, these design solutions are necessary for the implementation of the freight transport project to build competitiveness. As for passenger traffic, at present it can account for almost 20% of the total profit of the transport corridor. However, the implementation of passenger traffic will inevitably face difficulties due to the increased requirements for rolling stock. It should provide maximum comfort, appropriate service, services, safety, and speed of movement. The accessibility of this mode of transport should also be taken into account. The authors of the project also took care of this: on high-speed trains line BCM will be 4 classes of service, offering passengers a wide range of tariffs and, as a result, a

special ticket program. The project is so promising that it can compete with civil aviation.

Nowadays there are several variants of routes, each of which has its disadvantages and advantages. The two most preferred ones for Russia are the Northern Eurasian and Central Eurasian corridors. The first uses the port of Vladivostok, and the land version of the highway leaves the Chinese territory in Transbaikalsk and goes through Chita, Ulan-Ude, and Irkutsk to the Trans-Siberian. It goes through Yekaterinburg and Kazan to Moscow and Saint Petersburg and then by sea to the EU countries. The Central Eurasian Corridor runs from Shanghai through central China through Xi'an, Urumqi, and into Kazakhstan via the Dostyk border crossing. This option is considered to be part of the high-speed line Beijing-Moscow-Berlin [6], which is difficult to implement today due to the complicated international situation. It is not yet clear which option will be the main one approved for the project, as the issue of border crossings remains open. In addition, due to the difficulties in international relations, including the accompanying sanctions, and Europeans are paying particular attention to the options of a high-speed highway going around Russia.

The project is currently one of the most ambitious and ambitious. In addition to the projected profit, the high-speed highway has several undeniable advantages: firstly, a significant reduction in the environmental burden. Rail transport is the most environmentally friendly; secondly, a reduction in the number of fatalities in car accidents.

In summary, it would be desirable to note that Russian-Chinese relations are actively developing, and this direction can be called one of the most promising in the foreign policy of both countries. They are connected by numerous joint projects in various fields: science, education, industrial-civil and transport construction, the commercial-economic and financial sphere, health, etc. And whereas China used to be a third-world country, today it is the undisputed world leader in industrial production and economic growth. It is a nation with a rich cultural and historical heritage. At present, China still respects tradition but is also steadily moving forward, making many discoveries in various fields, introducing innovative technologies into everyday life, and taking care of the environment. That is why it needs a large number of specialists in various fields, so there is a developed system of attracting foreign students, primarily from Russia, which in the future can become Chinese citizens. At the same time, Chinese students study in the largest universities of the Russian Federation. The People's Republic of China needs allies, one of which is our country. Russia and China have centuries-old relations, which are developing and being transformed into new forms of cooperation.

References

1. *Khitrina A.O. Historical and cultural landscapes of the Great Silk Road. New ideas for the new century. 2017, no. 1, pp. 370-376. (in Russian)*
2. *Ayusheeva, S. N. Modern integration processes in the territory of the Great Silk Road and Tea Way. Pacific Geography. 2020, no. 4, pp. 21-28. (in Russian)*
3. *Russian-Chinese Dialogue: Model 2020. Available at: <https://russiancouncil.ru/activity/publications/rossiysko-kitayskiy-dialog-model-2020>. (accessed 8 July 2023).*
4. *Xing Guangcheng. Russian-Chinese relations - model of relations between new powers. The world of Russian-speaking countries. 2019, no. 1, pp. 8-14.*
5. *Kozlova, A. V. The cable car between Russia and China as one of the manifestations of economic and intercultural interaction. Basic and applied research of young scientists: Collection of materials of the V International scientific and practical conference of students, postgraduate students and young scientists. Omsk, 2021, pp. 446-450. (in Russian)*
6. *Pecheritsa, V. F. New stage in Russian-Chinese relations: union or strategic partnership. Social and Humanities in the Far East. 2015, no. 1, pp. 165-171. (in Russian)*

布里亚特共和国塔尔巴加泰区下日里姆老信徒村的历史（从起源到 1923 年）
**THE HISTORY OF THE OLD BELIEVER VILLAGE OF NIZHNY
ZHIRIM, TARBAGATAI DISTRICT OF THE REPUBLIC OF
BURYATIA (FROM ITS ORIGIN TO 1923)**

Nikolaeva Larisa Yurievna

*Candidate of Art Criticism, Associate Professor
East-Siberian State Institute of Culture*

Sannikova Marina Iosifovna

*Candidate of Historical Sciences, Associate Professor
East-Siberian State Institute of Culture*

抽象的。对微观历史的兴趣在现代历史科学中占有特殊的地位。下日里姆老信徒村在保留其传统面貌和生活方式方面是独一无二的。它的历史反映了18-20世纪俄罗斯历史上的主要事件。

关键词：外贝加尔老信徒、塞梅伊、别兹波波夫齐、下日里姆村的历史。

Abstract. *Interest in microhistory occupies a special place in modern historical science. The Old Believer village of Nizhny Zhirim is unique in terms of the preservation of its traditional appearance and way of life. Its history reflected the main events in the history of Russia in the 18th-20th centuries.*

Keywords: *Old Believers of Transbaikalia, Semey, Bezpopovtsy, history of the village of Nizhny Zhirim.*

The entire set of sources used can be divided into several groups. The first group of documents is represented by unpublished sources, namely the written sources of the State Archive of the Republic of Buryatia: F.88 “Office of the Verkhneudinsky commandant”, F.207 “Documents of the Tarbagatai command hut”, FR-248 “Council of Ministers of the Republic of Buryatia”, etc. with statistical data about the population and economic condition of the territory. The second group of sources consists of published documents (sources of personal origin are the memoirs of participants in the civil war in the territory of Transbaikalia B. Dobronravov [11], K. Ivailovsky [12], I. Kuznetsov-Vodkin [13], F. Shulunov [14]. The largest F.F. Bolonev is a researcher of the history of the Old Believers in Transbaikalia.

The schism in the Russian Orthodox Church was consolidated by the decisions of the Great Moscow Council of 1666-1667, which approved the church reform of Patriarch Nikon. Orthodox who rejected this reform and retained the old Orthodox faith were defined by the authorities as schismatics. By a decree of April 17, 1905, it was decided to replace the word “schismatic” with the word “Old Believer.” Accordingly, both of these terms are used as synonyms in archival sources, and in studies on the history of the Russian Orthodox Church in general, and the history of the Old Believers in particular. Fleeing from persecution, the Old Believers fled to the outskirts of the Russian Empire.

The appearance of the Old Believers in Transbaikalia in 1765 occurred during the military “expulsion” from Vetka (the Commonwealth) in 1764 and their subsequent transfer to Siberia. They were determined to settle in the status of state peasants. The lands of the modern Tarbagatai district of the Republic of Buryatia became the new residence.

The village of Nizhny Zhirim is located on the banks of a small river, once surrounded and overgrown with a solid forest, at a distance of 7 km before its confluence with the Selenga River. There used to be a lake and a swamp here. The original name of the village is Chirim, after the name of the Chirimka river of the same name, then Zhirim. Since 1876 - Nizhny Zhirim.

The village has two streets running parallel on both banks of the river from west to east, connected by a wooden bridge. The main street of modern Kalinin was built on a high (right) bank. The central part of this street, up to the bridge, is called the “Village” by the old-timers. here until the 1930s. the Old Believers had three Old Believer chapels and 1 prayer house, also in the village there was an Orthodox New Believer church and an administrative building. Currently, there is a village council, a school, a library, the club is located on the site of an Orthodox New Believer church. The part of the street around the turn to the bridge after the big log is called by the old-timers “Behind the log”, the width of the street is much narrower, the houses do not stand strictly in one line. The number of houses along Kalinin Street is 144. The second street - Traktovaya, in the colloquial “Zarechka”, was formed later. According to informants, it was 4 km longer to the east, and there was a second bridge in the village. Unlike the Russian villages of the first settlers, the houses in Nizhny Zhirim do not face the river, but on the contrary, with vegetable gardens that run in a wide strip along the shore. Due to deforestation around the village and the surrounding area, the river has dried up. The total length of the modern village is 4 km.

After the permission for the construction of cemeteries by the Old Believers by the Decree of April 17, 1905, there were 3 cemeteries in Nizhny Zhirim: bezpopovsky (in the upper part of the village, in the 1970s they “smelled”), priests (it was on a hillock in the middle of the village, in the 1970s . was also plowed up)

and Siberian (at the bottom of Kalinina St., on Mount Sibirka). Now in Zarechka on the mountain there is a new common cemetery.

Until 1816, the Tarbagatai department was part of the Mukhorshibir volost. In 1816, the Mukhorshibir volost was divided into two volosts, Mukhorshibir and Tarbagatai. And in 1882, the Kunaley, Kuytun and Bryansk volosts were separated from the Tarbagatai volost. The village of Nizhny Zhirim remained in the Tarbagatai volost.

The main source of information about the number of inhabitants in the Russian Empire in the XVII - I half of the XIX centuries. were revisions. Information about the number of residents of the village of Zhirim according to the 4th revision (1781-1787) can be identified from the statements of the 5th revision (1794-1808), preserved in the National Archives of the Republic of Buryatia [1].

Available information about the growth of the population of the village of Zhirim in the XVIII-XIX centuries can be shown in the table.

Table 1.

Population growth in the village of Nizhny Zhirim, Tarbagatai district

Year	Old Believers	Greek-Russian religion	Other	Total residents	Number of yards
1865	men- 4; wom.- 3.			7	2
1781-1787 (4th revision)	men.- 9; wom.- 6.			15	3
1795 (5th revision)	men.-17; wom.-13.			30	7
1795 (according to other data)	men.-15; wom.-12.			27	
1800	men. and wom.-39			39	
1811 (6th revision)	men.-82.				14
1818	(state peasants) men.-64.		yasash-3; retired soldiers-1		25
1818 (7th revision)	(state peasants) men.-108; wom.- 103. Totally: 211		yasash: men.-3; wom.- 1. settlers: men.-17; wom.-. attributed: - men.-6; wom.- 8.	246	

1819	men.-106; wom.-105. Totally: 211				
1835 (8th revision)	men.-182; wom.-158. Totally: 340	men.-72, wom.-68	Mohammedan: men.-6; settled foreigners: men.-6; wom.-3.	495	
1850	men.-183; wom.-195. Totally: 378				
1851 (9th revision)	men.-247; wom.-240. Totally: 589				
1853	Old Believers in Nizhny Zhirim:men.-203; wom.-211. Totally: 413 in Verkhny Zhirim: men.-203; wom.-211. Totally: 122			535	
1853 (Population of Zhirim together with Sharikha - Vekhny Zhirim	Popovtsy: men.-120; wom.-139. Totally: 259 Bezpopovtsy: men.-127; wom.-108. Totally: 235			494	
1858 (10th revision)	men.-200; wom.-250. Totally: 450		men.-40; wom.-41. Totally: 259	642	
1883	men -387; wom -379.			766	
1886	men -572; wom -546.			1118	
1896	men -521; wom -565.			1086	191

Sources used in the table: [1; 2; 4; 5; 6; 7; 8; 9].

The settlement of Zhirim proceeded gradually due to internal migration from neighboring villages. According to the revision tales of the 6th revision, a consistent slow increase in the number of inhabitants can be seen. Among the first to settle in the village of Zhirim were Rusyns, Petrovs, Kalashnikovs, Shilins, Emelyanovs, Ilyins, Mikhalevs - from Burnashevo, Trifonovs, Fedorovs, Kitaevs moved

from the settlement of Kuytunskaya, Revtsovs from the village of Kunaleyskaya. In addition, the names of the Kalashnikovs, Rusins, Petrovs, Shilins, Fomins, and Ostashevs appear in the revision tales of 1811 [2]. By 1811, the first chapel was opened in the village of Zhirimsky for the performance of trebs and prayers [1].

The reason for the appearance of the village of Zhirim was the reluctance of the Old Believers to settle together with the Nikonians. This is stated in the “Vedomosti, issued by the force of the command of His Excellency, Mr. Major General Larion Timofeevich, about the Old Believers living in the Verkhneudinsky District - settlers, withdrawn from Poland in different villages, and in which, and in which departments, that means the date of February 1795”. In accordance with this document, the date of foundation of the village is 1765. Researcher F.F. Bolonev explains this process by the tendency to “territorial isolation on the basis of faith.” At the same time, “local, especially church authorities, did not interfere, but rather encouraged this process of religious isolation, jealously demanding that the Old Believers not involve others in the schism” [19].

From the second decade of the XIX century. Nikonians begin to move to Zhirim. So, according to the 1835 census, there were already 140 inhabitants of the “Greek-Russian religion”, 6 “Mohammedans” and 9 “settled non-christs” [5]. Submitted statistical data on population according to different statements within one year do not always coincide. Information was requested by the zemstvo council, the diocese, the commandant’s office. Apparently, the unrecorded population was everywhere in the Russian Empire, but here it was aggravated by the question of faith, the refusal to communicate with the authorities. The difference in the count is explained by the presence of Bezpovovtsy who conducted economic and economic activities, but did not apply to the authorities. The number of Bezpovovtshy always assumed. In Nizhny Zhirim, they made up from a quarter to a third of the population.

Subsistence farming prevailed in the village. Most of the needs were met by home-made products. Sometimes the resulting products were exchanged for items made by local craftsmen. Residents of Zhirim grew rye (yarnitsa), wheat, oats, barley, buckwheat, and hemp. Gardens were located in the floodplain and above, ditches for irrigation were diverted from the river, which were used until recently. The gardens were mostly taken care of by women and children. Cabbage, carrots, onions, garlic, radishes, turnips, turnips, radishes, dill, beets, and potatoes were grown. In the statement of 1836 on the amount of land in the villages of the Tarbagatai volost for 1835, there is a record that the village of Zhirimskoe has 48 tithing under construction; 700 - arable land, 100 - hay fields; 50 - pastures, forests of drill and firewood, no shrubs, uncomfortable land - 683 [5]. Based on the number of the male population (250 people) in Zhirim, each had 2.8 tithing of land. In addition to animal husbandry and vegetable growing, the Zhirim people were

engaged in hunting. Hunters hunted fox, wolf, hare, wild boar, squirrel, roe deer and bear with great success. So, in 1845, the number of hunters in Zhirim was 25 people, they needed 1 pood of gunpowder, lead for 3 pounds, 1 pood, 35 pounds.

At the end of 1876, the Main Directorate of Eastern Siberia granted the petition of the peasants of Upper Zhirim for their separation from Zhirim in the amount of 111 male and 116 female souls with land plots. Since that time, Zhirim is officially called Nizhny Zhirim.

According to the “Vedomosti of 1886 on the growth of bread and herbs in the Tarbagatai volost”, in the Nizhnezhirimsky village, 1220 tithing were sown with bread (953 tithing of yaris, 247 tithing of wheat), 20 tithing of oats. With the number of 572 souls of the male population, each accounted for 2.2 tithes. This reflects the scarcity of arable land. The Old Believers in Siberia were limited in land from the moment of resettlement, so they were forced to save and increase productivity. While for voluntary migrants, a “labor” norm of 15 tithing per male soul was established.

For additional income, the inhabitants of Nizhnezhirim found work far from the village: they were mainly hired as coachmen for transporting goods, including for a distillery and railway construction, and went to gold mines [19]. Many residents were engaged in additional earnings at home: they were engaged in leather craft, carpentry, construction, fishing, weaving. The farm always had: a plow, a harrow, a cart, a sleigh. Wealthier families used winnowers and threshers. Pigs, cows, rams, goats, chickens, geese were bred in the subsidiary farm. According to archival information in 1896, the village had five flour mills, a bread store, a manufacturing shop, a fire shed, and a glacier. There was one prayer house of Bezpopovtsy [8].

The advent of the XX century. in the history of Russia was marked by the Russo-Japanese War and the First Russian Revolution of 1905.

Russo-Japanese War 1904-1905 significantly affected the position of Transbaikalia, located close to the theater of operations. Mobilization is carried out urgently in all villages, and Transbaikalians are among the first to go to the battlefields. The peasants who remained at home were obliged to supply horses and fodder to the army, and transport military goods. There is information about the reserve lower ranks, recognized in the troops on the mobilization of 1904 for the war with Japan. In total, 28 people were called; of these, 2 people were killed in the war; wounded - 0; shell-shocked - 2 people [18, 20].

During the First Russian Revolution of 1905, civil rights were returned to the Old Believers. In 1906, a census of the amount of land in the villages took place. In the Nizhnezhirimsky village it is shown: the number of tithing of arable land - 2025; hay land - 22; pasture land - 13. Total 2.7 tenth on a man's soul.

According to information from 1910, the Nizhny Zhirim peasants not only sold bread, but also took deposit money for the harvest in the city of Verkhneudinsk.

Actively engaged in export. “These are three - four, sometimes more, the carts were loaded with grain, hay, whoever could, and went, some to Verkhneudinsk, and some even to Kyakhta. Tea, oil, wool, leather were brought from there. Sometimes carts were taken from Kyakhta to the city of Verkhneudinsk. And so they drove all winter from Verkhneudinsk to Kyakhta and back. The earnings were not bad, and you will make a reserve for yourself” [10].

Little is known about the participation of the Old Believers in the First World War. According to archival data dated July 18, 1914, 21 people were mobilized from the village of Nizhny Zhirim [18, 20]. During the February Revolution of 1907, along with the organs of the Provisional Government, there were Soviets of Workers’ and Soldiers’ Deputies. After the October Revolution, the establishment of Soviet power in the Trans-Baikal region was delayed until March 1918, but even then it did not consolidate for a long time. The military opposition of the White Army was “supported” by the “Czechoslovak” rebellion in May 1918. In August 1918, the intervention of the USA and Japan began. The “Government of the Trans-Baikal Region” of Ataman Semenov and the national self-government bodies were in difficult relations with the Government of Admiral Kolchak.

During 1918 and especially at the beginning of 1919, the dissatisfaction of the peasants intensified and resulted in armed uprisings in March and August 1919. At the end of 1919, the situation escalated due to the retreat of Kolchak’s troops and, separately, the Kappelites.

The direct cause of the peasant uprising in December 1918 was the dispatch of punitive detachments of the Semenovites under the command of Kurbatov and Zhirnov to Tarbagatai. In response to this, on December 8, 1918, at a rural meeting in the village. Desyatnikovo sounded a call for an uprising, a combat detachment was created and the collection of weapons began. “Not dwelling on this, the (Zagansky) headquarters sends representatives to organize the uprising - to the village. Kunaley comrade Loschenkov Konstantin, in Burnashevo - Loschenkov Grigory and Mikhalev Ivan, in Tarbagatai - Grigoriev Kondraty and in other nearby villages: Pesterevo, Lower and Verkhny Zhirim, Klyuchi. Within two or three days, the working peasants without exception took the side of the revolutionary movement to fight the atamanism, organizing fighting squads in every village” [12].

“The main difficulty that the leaders and participants in the uprising had to reckon with first of all was the extremely insufficient number of weapons, especially firearms” [13]. “The rebels had only the smallest number of rifles, which were preserved from the population from 1918 and were taken from the Semenov militia during its disarmament. Most of the partisans were armed with berdans, shotguns and edged weapons. In addition, there were few cartridges with firearms, usually 3-4 per weapon. In many places, the partisans had to arm themselves with

simple pitchforks and clubs” [13]. “Flintlock gun” were used. Workshops for the repair of weapons and the manufacture of lances and sabers were also organized.

Semyonov’s punishers moved to Tarbagatai. According to the recollection of a participant in the events, B. Dobronravov, during the battle with the Semenovites, “we decided to make such a maneuver: we sent out orderlies throughout the village, convened the population so that they all went out with anything on the ridge. And so women, old men, old women - all with pitchforks, some with axes, some with shovels - all stood up to protect the village. There are about 5 thousand people in Tarbagatai, and when this avalanche moved up the mountain, the White Guard detachment was confused, it turned back and began to retreat” [11].

According to the memoirs of another participant, F. Chebunin: “Our positions were on Omulevka and the Kardon Heights. Under the pressure of a well-armed force, over 1000 people, we retreated from the Kardon Heights and fought on Omulevka (a mountain 2 km from Tarbagatai), which lasted more than 6 hours. During the battle, I, having transferred command of the detachments to comrades Mikhalev, Loshchenko 2nd and Dumnov, rushed to Tarbagatai for help from the peasants. The entire population was urgently notified, which, from small to great, rushed to Omulevka. The enemy, seeing a huge crowd advancing on the position and assuming that these were our fresh forces, hastily began to retreat. We continued the pursuit until Vakhmistrovo. In these battles, we took a gun. “Even old people took part in the fighting; for example, in the battle near Omulevka, an old man of 70 years old was killed, who fled to the attack with a scythe in his hands” [13].

“In just two weeks, the uprising engulfed the vast expanse of the basin of the middle reaches of the river. Selenga from Verkhneudinsk almost to Troitskosavsk with the valleys of the lower and middle reaches of the Khilka and Chikoya rivers” [13]. “To suppress the uprising in the areas covered by the uprising, punitive expeditions were sent from three sides: from Verkhneudinsk the so-called “wild division” under the command of General Levitsky in 900 people, from the Petrovsky plant - a detachment that included 800 Japanese and 400 whites, and from Troitskosavsk - the forces of the so-called “Urginsky detachment” or the Krymov detachment of 600 people” [13]. In the absence of units of the regular Red Army, the rebel detachments were united into several fronts, collectively called the “bearded” or “Semeysky” front [11].

In the same way, “the Bichurians, in order to prevent a punitive detachment, were all without exception mobilized and put up in a crowd of 2,000 people to meet the detachment. Many of them were armed with pikes, crowbars, stakes, and so on. The detachment, seeing a large number of people, turned in a different direction.

There is ambiguity in assessing the role of Semeysky in the civil war. They were opposed to the Russian population and the local indigenous: “Great-power

chauvinists in the person of agents of the Kolchak-Semenov government, Russian merchants, kulaks, priests, Old Believer usurers sought to isolate the peasants of the “Semeysky” and from the Russian “non-Semey” population and from the Buryat-Mongols. [13].

The cohesion of the community, the preservation of patriarchal foundations were manifested in the fact that everyone participated in the partisan movement. Members of the partisan movement from Nizhny Zhirim, Vasily Eremeevich Pokatsky and Aleksey Georgievich Petrov, were less than 17 years old at the time of the partisan war, and Faliley Nikiforovich Mokrov was less than 12 years old. This information is only about those who came from the families of the scribes and tutors (Minutes No. 10 “Meetings of the commission to review the lists of persons deprived of voting rights” dated June 16, 1930 in the Nizhne Zhirimsky village council) [18].

In March 1920, Verkhneudink was liberated from the invaders by the partisans. On April 6, 1920, the Far Eastern Republic was created, which existed until the creation of the Buryat-Mongolian Autonomous Socialist Republic in 1923.

References

1. *State Archive of the Republic of Buryatia (SARB) F.44. Op.1. D.1. Ll. 232-244.*
2. *SARB. F.88. Op.1. D.40. L. 40.*
3. *SARB. F.207. Op.1. D.1/89. Ll. 17 V.-18.*
4. *SARB. F.207. Op.1. D.19. Ll. 32 V.-33.*
5. *SARB. F.207. Op.1. D.22. Ll. 116 V.-121.*
6. *SARB. F.207. O.1. D. 245. Ll 38-40*
7. *SARB. F.207. Op.1. D.806. Ll.11-12.*
8. *SARB. F. 207. Op. 1. D. 516. Ll. 44, 44 V.*
9. *SARB. F. 207. Op. 1. D.1629. Ll.22-39.*
10. *History of the collective farm: [manuscript] // Nizhnezhirimskaya rural library of the Tarbagatai district of the Republic of Buryatia.*
11. *Dobronravov B. On the red fronts of the Baikal region // Buryat-Mongolia in the struggle for the Soviets: (Collection of memoirs and documents) / ed. M. Gudoshnikov, I. Kuznetsov and F. Shulunov. Irkutsk, 1933. P. 101-102*
12. *Ivailovsky K. From the history of the revolutionary insurgency in the V-Udinsky district at the end of 1919 // Buryat-Mongolia in the struggle for the Soviets: (Coll. of Memoirs and Documents) / ed. M. Gudoshnikov, I. Kuznetsov and F. Shulunov. Irkutsk, 1933. P. 110-113*
13. *Kuznetsov-Voronov I. Party at the head of workers and peasants in the struggle for the Soviets in Buryatia: [memoirs]// Buryat-Mongolia in the struggle for the Soviets: (Collection of memoirs and documents) / ed. M. Gudoshnikov, I. Kuznetsov and F. Shulunov. Irkutsk, 1933. P. 5-32.*

14. Shulunov F. *Partisan movement in Buryatia: (Short essay): [memories]// Buryat-Mongolia in the struggle for the Soviets: (Collection of memoirs and documents) / ed. M. Gudoshnikov, I. Kuznetsov and F. Shulunov. Irkutsk, 1933. P. 33-62.*

15. Bolonev F. F. *Dwelling // Old Believers (Semeisky) of Buryatia: on the 250th anniversary of the arrival of the first settlers – Old Believers in Buryatia: historical and cultural. encycle. ref. Ulan-Ude, 2015. P. 81-83.*

16. Bolonev F. F. *Semeyskie: Historical and ethnographic essays. Ulan-Ude, 1992. – 224 p.*

17. Bolonev F. F. *Old Believers of Transbaikalia in the XVIII-XX centuries. / answer. ed. L. M. Rusakova; Ros. acad. Sciences, Sib. Department, Institute of Archeology and Ethnography, Russian House of Nat. traditions. Novosibirsk, 1994. 145, [5]p. ,[13]l.*

18. Bolonev F. F. *Old Believers of Transbaikalia in the XVIII-XX centuries. Moscow, 2004. 352 p.*

19. Petrov S. P. *The Old Orthodox Faith beyond the Baikal Sea. Bishop Athanasius of Tarbagatai, Irkutsk-Amur and the entire Far East. Ulan-Ude, 2013. 392 p.*

20. Pykin V. M. *Old Believers of Transbaikalia - Semey: Materials for a special course / Buryat. state un-ty. Ulan-Ude, 2009. 166, [2]p.*

美术作为俄罗斯和中国文化的对话：苏联时期
**FINE ARTS AS A DIALOGUE OF RUSSIAN AND CHINESE
CULTURES: SOVIET PERIOD**

Ma Haijun

Postgraduate

Vladivostok State University, Vladivostok, Russia

Tkachenko Elena Vladimirovna

Candidate of Culturology, Associate Professor, Scientific Supervisor

Vladivostok State University, Vladivostok, Russia

注解。国家的形象、发展的理念、民族感情的观念都是以文化为基础的。俄罗斯和中国有兴趣更全面、更深入地了解和理解彼此的文化，以找出可能实现文化和解的正确途径。俄罗斯和中国艺术家的美术为两国人民之间的文化交流提供了宝贵的经验。美术是人类社会重要的文化组成部分，是文化对话过程的表现形式。

关键词：美术、再现、文化对话、苏联时期、中华人民共和国。

Annotation. *The image of the country, the idea of its development, the concept of national feeling is based on culture. Russia and China are interested in a fuller and deeper understanding and comprehension of each other's culture, to outline the right ways to possible cultural rapprochement. The fine arts of Russian and Chinese artists provide invaluable experience of cultural contacts between the peoples of the two countries. Fine art is an important cultural component of human society, a form of representing the processes of dialogue of cultures.*

Keywords: *fine art, representation, dialogue of cultures, Soviet period, People's Republic of China.*

At present, international relations between Russia and China attract the views of many world experts. China and Russia are locked in a strategic alliance, which is absolutely unique in world history and the exchange of achievements in the field of art, is an essential form of communication between the states and an effective means of achieving mutual understanding and friendship. Fine arts is an understandable and time-tested language of fruitful communication that contributes to the rapprochement of the peoples of the People's Republic of China and the Russian Federation. Numerous forms of Russian-Chinese intercultural communication in the field of fine arts have been developing for many years, constituting

an important factor of mutual understanding and good-neighborliness of the two great countries, and equally contributing to the development of the system of dialogue between the cultures of Russia and China

The problems of the history and theory of fine arts have been studied by both Chinese and Russian researchers, for example: Valitskaya A.P., Wang Zhong, Vasiliev L.V., Gizatov K.T., Li Dao, Liu Chun, Petrov S.M., Xi Jingzhi, Zhao Li, Cheng Liusheng, Yang Feiyun.

Object: samples of fine art of Chinese artists, representing the dialogue of cultures

Objective: to identify the peculiarities of the visual art of Chinese artists, representing the processes of the dialogue of cultures between Russia and China.

Methodology of the study of visual culture and art history became the principles of systematic and comparative analysis; analysis; methods of art history approach to the study of the processes of development of visual art in general and painting in particular.

The period in the development of Chinese oil painting in the 1950s-1960s is an important moment for understanding the dialogue of cultures. During this period, the influence of Soviet art on the art life of China expanded due to the cultural exchange between the two countries. The Chinese government, interested in ending political isolation, organised all possible cultural and artistic exchanges, thus maintaining diplomatic etiquette. At first, friendly relations were established with the surrounding socialist states, then, in 1950, the “Soviet-Chinese Treaty of Friendship, Alliance and Mutual Assistance” was concluded with the Soviet Union. In the field of art exchange, exhibitions of Soviet paintings were brought to the PRC. At that time, China, following the example of the Soviet Union, was fully building and developing a socialist state. An exhibition hall in Russian classical architectural style was built in Beijing to study and borrow Soviet experience.

Thus, in 1951, the Central Academy of Fine Arts hosted an exhibition of Soviet propaganda posters and cartoons. The exhibition was the first event to introduce Soviet painting to the Chinese. It was the first to be held in the country after the establishment of the PRC. At that time, Soviet painting received a good public response in Beijing, becoming a benchmark for many artists, revealing an interest in military themes. Soviet art had a profound influence on Chinese art. The agit-posters presented at the exhibition in Beijing promoted and increased the people’s labour enthusiasm; with the help of vivid concrete images, it faithfully reflected the real picture of life [1].

In the 50s of the twentieth century in Beijing opened the exhibition “Achievements of Soviet economic and cultural construction” [2]. This exhibition was characterised by a wide variety of subjects, mainly the themes of war and peace. These works allowed artists and the people of China to feel how many disasters

the war brought to Russia, at the same time, they comprehensively revealed to the masses the image of the daily life of the Soviet people and earned wide recognition and dissemination in China. The “Exhibition of Achievements of Soviet Economic and Cultural Construction” presented in Beijing had a profound influence on Chinese artists and allowed them to recognise Soviet realist painting in a completely new way.

In November 1957, the “Exhibition of Russian Painting from the 18th to the 20th Century” opened in Beijing to commemorate the 40th anniversary of the victory of the Soviet October Revolution, its main purpose was to strengthen cultural and artistic exchange between China and the Soviet Union. “The exhibition displayed more than 60 oil paintings, becoming a springboard for New China artists. Mainly classical paintings from the 18th to the 20th century, from the works of F.S. Rokotov to those of V.A. Serov, Russian painting of this time was primarily represented by the portrait genre” were presented [2].

Currently, the topic of socialist realism is of great interest to both Chinese and Russian researchers due to the great influence of the Soviet Union on the People’s Republic of China in many areas, including art [5]. The paintings of this genre are a reflection of the life of the state, its culture, traditions, etc. The study analysed oil paintings from the galleries of museums such as Tianjin Yangliuqing Painting Workshop, National Painting Museum of China, Shanghai Propaganda Museum and On-Xiangning Art Museum. These museums are of great interest as their galleries display paintings from the Soviet period that reflect the lives of the Chinese people, as well as their leaders and dignitaries, and reflections of significant events in national history.

Analysing the works of Soviet artists we can identify several main themes:

- 1) The “martyr” theme;
- 2) “Military” theme;
- 3) The theme of “leader”;
- 4) The theme of “working class”.

Next, it is necessary to consider which of the above themes were depicted in the paintings of Chinese artists.

The theme of the “martyr”. A symbol in Chinese communist oil paintings was the image of a fallen comrade, and one of the most famous works on this theme, an example of Soviet socialist realism, was Quan Shanshi’s “Unabashed Heroism” [1].

Quan’s painting shows the body of a martyr lying on a lush field and covered with a red cloth, indicating his revolutionary spirit. Surrounding the body are peasants who look dejected as many of them were wounded in the battle. In their hands are long spears, pitchforks and rifles - a kind of preparation to defend their territories. Red banners are flying in the background, denoting the political

nature of the painting. In the middle stands the leader with his hands on his hips, his gaze reflecting the splendid future made possible only by the sacrifices of such martyrs. Others mourn in silence. In the foreground, a young boy stands in front of the fallen martyr, clenching his fists to pay his respects. While the peasants seem to show extraordinary restraint, their postures reflect fierce resistance and willingness to sacrifice. The people in the painting reflect a new realism in art that differed markedly from traditional Chinese painting, in which artists emphasised the inner life of human beings rather than their formal appearance through their surroundings and various attributes.

The artist himself noted: “To enhance the symbolic representation of my painting, I monumentalise the martyrs as a way of expressing people’s sorrow and hatred, as well as their confidence in their strength to win in the future struggle” [7, c. 59]. Quan affirmed that the depiction of the martyr’s body “is crucial to the whole painting. Without it, the painting does not achieve the desired effect” [7, c. 62]. The young boy in the foreground, a symbol of the future, conveys, according to the artist, “symbolises the idea of continuing the struggle [for the revolution]” [7, c. 69]. The first rays of the sun in the background announce the advent of a new era.

The “military” theme. Another central theme in socialist art was the depiction of great battles in the history of the Chinese Communist Party. One such theme was reflected in paintings that glorified the military tradition of the Red Army and justified the ongoing armed struggle against the enemy. Two military themes covered by such paintings were the war against Japan (1937 - 1945), exemplified by Zhang Jianjun’s “Five Heroes of Mount Langya” and the civil war against the Nationalists depicted in Bao Jia and Jiang Fagen’s “The Great Victory at Huai-Hai”.

“Five Heroes of Mount Langya” by Zhang Jianjun combines meticulous research of source material with superb craftsmanship. Based on real events, the painting depicts five communist soldiers fighting against Japanese troops on Mount Langya in September 1941. Instead of depicting a conventional battle, Zhang depicted the five heroes with weapons in their hands standing on top of a cliff, preparing to jump. “To create a memorable effect, I wanted to capture the indomitable spirit of the soldiers before their self-sacrifice,” Zhang wrote in his article shortly after he completed the painting [8, p. 17]. It is also worth noting that this work of art emphasises the coherence of the group, but their distinctive features emphasise their individuality. The compositional pyramid formed by five soldiers reflects the artist’s longstanding interest in geometric form, which emphasises many of his works. The pyramidal composition, according to the artist, was intended to “create the effect of a monument.” Zhang’s efforts were clearly successful, as one art historian remarked, “It looks like the soldiers are not standing on top of the hill, but growing out of it” [9, p. 24] [9, c. 24].

Bao Jia and Zhang Fagen’s “The Great Victory at Huai-Hei” illustrates a different type of military conflict: it is a panoramic view of the Red Army on an

invincible march in central China during the civil war between the Communists and Nationalists (1945 - 1949). “The Great Victory in Huai Hei”, painted in the traditional oil painting technique, shows the Communists’ victorious conclusion of the Huai Hei Campaign, which was fought in southern Shandong Province and northern Jiangsu Province from late 1948 to early 1949. The painting shows waving flags, tanks, and countless soldiers, some on horseback but most on foot, moving in a grand procession across the battlefield. Behind them on the right, at the top of the painting, peasants push carts carrying their belongings, forming a link between the commoners and the soldiers. On the lower left corner of the painting are wounded Kuomintang soldiers and their damaged lorries. Thus, the concept of the painting marks a clear diagonal division between the victors and the vanquished.

The contrasting colours are sharp and distinctive. At the top of the painting, the Chinese Liberation Army marches under a bright dawn sky, a sign of a promising future, while the defeated are depicted in blue and dark colours reflecting mockery and defeat. Bao Jia explained that the colour variation in the painting, “bright and dark, cold and warm”, was meant to reflect “the strength of the revolutionary forces of the people, rapidly advancing” [3, c. 6].

The theme of “leader”. At the heart of socialist realism is the theme of the supreme leader, an image that was clearly evident in the Soviet Union in the 1930s and 1940s, when portraits of Stalin were central to the government’s visual propaganda. The same can be said of China, where Mao Zedong’s dominance was unprecedented. Nowhere was this more clearly manifested than in “Chairman Mao Zedong at the December Conference” [1, c. 71].

The artist’s mission was to demonstrate “the brilliance, wisdom, determination, steadfastness, foresight and ability to foresee the inevitable victory of the nationwide revolution” of the chairman at a critical stage in the history of the CCP. “Without a decisive hand gesture, it would be difficult to demonstrate the chairman’s bold vision in brilliantly achieving the right decisions” [6, c. 20]. Mao’s facial expression is one of confidence and determination that speaks of complete control over any situation. The chairman speaks to his senior aides at the meeting, but they are not shown in the painting. By leaving the audience behind, Jin Shanyi creates tension between the chairman and his followers and makes the viewer curious about the expressions on the faces of his listeners, which can only be imagined.

The artist’s work is clearly influenced by Soviet art. Jing is an outstanding portrait artist who captures the imposing character of a leader with great sensitivity. His concept of the “hand gesture”, perhaps influenced by his Soviet counterparts who often depicted Lenin and Stalin with their hands raised, seems to indicate a bright future for the People’s Republic of China.

The theme of the “working class”. The painting “Comrade Liu Shaoqi and the

Miners of Anyuan” by Chinese artist Hou Yiming reflects the theme of the working class. The painting depicts Liu Shaoqi, a young leader leading the struggle against exploiters, an episode officially canonised in the 1950s as an early attempt by the CCP to launch a trade union movement in the country. As a leader Liu guides a multitude of workers, on a path to destroy an unjust system. Positioned in the foreground of the painting, he exudes unstoppable energy. But the strike is never a solitary struggle - with hands raised in protest and pickaxes on their shoulders, the workers are also on the offensive, as one art historian described this battle scene [5, p. 16].

“The Nation Foundation Ceremony” by Dong Xiwen solemnly concludes the visual narrative of the history of the Chinese Communist Party on canvas. In documenting a historical event in contemporary China, Dong’s work is very authentic. The painting is done in the style of a popular traditional folk art technique with sharp contrasting colours, in this case bright red columns and lanterns, blue sky and white clouds. While chrysanthemums are a familiar symbol of longevity, white doves released into the sky symbolise the beginning of peace in a land long ravaged by chaos and war. A new national flag has been raised in the centre of Tiananmen Square, and hundreds of thousands of people, surrounded by colourful banners, stand in formation, admiring the chairman and listening to his statement.

Although he was trained in Western painting, Dong’s work was undoubtedly influenced by traditional painting, which the government actively promoted as a popular folk art in the 1950s. “Chinese people love bright, saturated colours,” Dong wrote in 1953. - “This concept is in keeping with the theme of the Nation’s Founding Ceremony. In my choice of colours, I did not hesitate to leave aside the complex colours commonly used in Western painting, as well as the generally accepted rules of painting” [4, p. 34]. “If this painting is rich in national styles,” he continued, “it is largely because I have adopted these [native] approaches.” [4, c. 36]. In 1953, Dong’s famous painting was widely distributed by government publishers along with other paintings. It was very popular, selling 560,000 copies in three months in its initial printings.

Concentric circles are the dominant pattern in Dong painting, and Mao’s centrality in this pattern is unmistakable. The Chairman is no longer a man of action, as he was during the civil war, he looks majestic and imposing. But unlike the real event, when he made the historic announcement surrounded by his closest comrades, including Zhu De and Zhou Enlai, in the painting he stands alone, almost at the centre, separate from everyone else. His closest comrades standing to his left form an inner circle. The next circle is the assembled audience, lined up in rows in a huge square and surrounded by old city walls that will be demolished in the mid-1950s, greatly enlarging the area. Beyond the walls is a distant centuries-old city, and at the very edge the nation shines under blue skies and bright clouds, awaiting

a glorious future. Without a doubt, Mao is the heart of this symbolic world, and his vision extends far beyond the path to a new world. Despite the hyperbole, Mao's statement points to an important reason why historical paintings were popular: they were a powerful means of demonstrating national pride [1, p. 93].

Thus, the themes of Soviet art were close to Chinese artists. Familiarising themselves with oil painting of the Soviet period, the PRC painters created a number of paintings close in theme, but possessing their own specificity of national vision and artistic presentation.

The image of the country, the idea of its development, the concept of national feeling is based through culture. The transformation of the image of the country through creativity is becoming a "hot" topic of our time. Russia and China are interested in understanding and comprehending each other's culture more fully and deeply, in outlining the right ways for possible cultural rapprochement. The fine arts of Russian and Chinese artists provide invaluable experience of cultural contacts between the peoples of the two countries. Fine art is an important cultural component of human society, as well as one of the main forms, demonstrating representative processes of the dialogue of cultures and has not only cognitive, theoretical value for modernity, but also bears actual practical significance. Identification of the features of fine art of Russian and Chinese artists, representing the processes of the dialogue of cultures of Russia and China, becomes not only relevant, but also necessary.

References

1. *Study of the experience of Soviet economic and cultural construction // Zhenmin Zhibao newspaper, 1954. № 1.* (学习苏联经济和文化建设的经验[N]. 人民日报, 1954. 1)
2. *Exhibitions of works by Soviet artists in 1955-1957 // Fine Arts, 1958. № 7.* (1955—1957 苏联美术家作品展览会[J]. 美术, 1958. 7).
3. *Tong Jinghan. Sino-Soviet Artistic Exchange at the Initial Stage of the PRC // Artistic Review, 2009. № 3.* (佟景韩. 新中国初期的中苏美术交流[J]. 美术观察, 2009. 3).
4. *Hu Qingqing. Exhibitions of Soviet oil painting held in China during the PRC period and their influence // Artistic Research, 2017. № 7.* (胡清清. 新中国时期苏联来华举办的油画展览及其影响[J]. 艺术探索, 2017. 7).
5. *Fan Wennan. Influence of Soviet fine arts on Chinese oil painting education - the period of the rise of Sino-Soviet oil painting educational exchange (1954-1962) // Великолепие искусства, 2010. № 5.* (范文南. 苏联美术对中国油画教育的影响(之二)——中苏油画教育交流的繁荣阶段(1954 — 1962) [J]. 美术大观, 2010. 5).

6. *Boga. Show the spirit of the times from the great scenes of war // Fine Arts . -1961. - P.30.* (鲍加. 从战争大场面中表现时代精神[J] . 美术. 1961年. 30页.)
7. *Dong Siwen. Oil Painting Foundation Ceremony Creative Experience // Art Review. —1953. — p.41.* (董希文. 油画开国大典创作经验. 新观察. 1953年. (第21期) . 41页.)
8. *Mao Zedong Red Book. //— M: Eksmo, 2017.- 226 p.*
9. *Sinyavsky A.D. What is socialist realism // Self-publ.- 1953. 26 p.*

艺术市场的文化创造功能

CULTURE-CREATION FUNCTION OF THE ART-MARKET

Shatilov Vadim Vadimovich

Lecturer

Lugansk State Academy of Culture and Arts n.a. Mikhail Matusovsky

抽象的。 本文讨论了艺术市场机构的文化和创意功能。 它分析了双年展、画廊和展览策展人如何取代艺术批评机构并承担当代艺术教育者和普及者的角色。 双年展和博物馆等非营利机构在艺术市场定价中的作用已经确立。 当代艺术作品被认为是象征资本的来源。

关键词: 艺术批评、艺术市场、艺术博览会、双年展、全球本土化、示范性消费、文化。

Abstract. *the article deals with the cultural and creative function of art market institutions. It analyses how biennales, galleries and exhibition curators are replacing the institution of art criticism and taking on the role of educators and popularisers of contemporary art. The role of non-profit institutions such as biennales and museums in pricing the art market is established. Works of contemporary art are considered as sources of symbolic capital.*

Keywords: *art criticism, art market, art fair, biennale, glocalisation, demonstrative consumption, culture.*

In economic science, the concept of “expert opinion system” is widespread - whose main task is to objectively assess the characteristics of a particular product. Such a system also exists in the art market, being an example of a social contract between its players. Who are these experts, who assess the financial and cultural value of a work and on whom the fate of the artistic process depends as a result?

In the nineteenth century the expert community was represented by art critics; in the nineteenth century they were replaced by curators. In France, the symbiosis between the curator and the art dealer represented the marchand institution . Whereas previously an artist was judged on the basis of a particular painting selected by the academy for an exhibition, thanks to the activity of marchants, the focus of the public’s attention was shifted from the individual work to the process of the author’s artistic development as a whole. Such a shift in focus would not have been possible without solo exhibitions that allowed the public to

make a judgement on the artist's work based on a holistic view of his practice. This was an entirely new genre not practised by the academies. Unlike the academies, the Marchand was interested in the long-term development of the artist's career, becoming both patron and employer. The modern concept of the gallery as a commercial exhibition space combining the functions of a museum and a shop was formed at the same time. However, the independence of the curator-dealer's judgement is highly questionable and essentially contradicts its second hypostasis.

The growth in the number of fairs is directly proportional to the financial demand for works of contemporary art: in 2000 there were 36 art fairs, in 2005 - 68, in 2011 - 189, in 2014 - more than 200 [1, p. 16], before the introduction of pandemic restrictions in 2020 365 art fairs were announced [2]. The early 2000s saw dramatic changes in the organisation of art fairs. An important role in this process belongs to Sam Keller, who revamped Art Basel beyond recognition. Whereas it used to showcase art as a result of creative endeavour and part of art history, now, thanks to a series of private shows, parties and entertainment events, art has become broadcast as an integral component of an elitist lifestyle.

The modern fair is a grand but short-lived event, rarely lasting more than 4 days. Its main difference from its predecessors is a diverse cultural and entertainment programme that attracts even the audience that does not plan to buy anything. Such events include round tables, discussions, performances, film screenings, master classes and educational programmes, which seemingly have no commercial significance, but greatly strengthen the reputation of the fair. It was at Art Basel that experimental platforms appeared for the first time, demonstrating alternative projects that do not fit into the exposition of typical stands. These can be performances, video projections, non-formal sculptures and installations made by artists on the order of the fair organisers for a specific event.

In the wake of globalisation since the 1990s, art fairs have also become international, with Art Basel taking place in three parts of the world - Europe, North America and Asia. One of the significant changes that influenced the development of art culture was the adoption of show business techniques by the art market. Art fairs have become a kind of equivalent of fashion weeks, placing the shopping experience in a socio-cultural context. Auction houses also apply the same seasonal logic, scheduling their auctions to coincide with the time and place of major fairs. Both institutions impose their own pace on authors, maintaining the illusion that art should be fashionable and careers fast-paced. At this pace, the artist turns into a fashion house designer whose activities are entirely subordinated to a seasonal schedule. In such conveyor belt conditions it is difficult for an artist to maintain creative integrity, and each subsequent work becomes not so much a product of inner work as a semi-reflexive reaction to an external stimulus.

In addition to seasonality and the multiplied role of the author's personality, the art market has borrowed the concept of "brandiness" from the fashion industry.

Donald Thompson, a lecturer at the Sotheby's Institute, generally views the art market as a system of brands. All participants of the art market turn into brands, the interrelation of which becomes the essence of the art market, and it also influences the formation of prices. These brands (artists, galleries, collectors, etc.) become beacons that allow buyers to navigate the vast offer. "Since collectors cannot fully understand the secret language of professionals, they have a natural uncertainty about their own valuations. As a result, they are often forced to rely on the brand, that is, on a stable reputation, a certain trade mark" [3, c. 20]. In such a system, the buyer does not need to understand the theory and history of art, it is enough to recognise marketing codes and monitor the dynamics in the investment market. The total value of the brand depends on the popularity of the author, the authority of the gallery and collectors, the number of museum exhibitions and the position in the investment art rating. Donald Thompson expresses confidence that the top lines of the position in the art market can take almost any work, regardless of its artistic qualities, the main thing is to develop a competent marketing strategy to promote the artist.

Trade in actual art is most often given to galleries and fairs, auctions prefer to work with works in traditional techniques. The very structure of bidding makes it difficult to sell installations, videos or large format works. The mechanics of an auction involve a quick transaction - literally in a few minutes. Its results are open to the general public, and failure, for example, in the form of lack of a buyer or sale below the estimate, fraught with negative consequences for both the seller and the reputation of the auction house. If several bidding works of the artist do not find a buyer, he will disappear from the radar of auctions.

The fundamental difference between auctions and galleries lies precisely in the openness of the results of transactions to the general public. Galleries adhere to the principle of confidentiality in financial matters, especially if they are of a negative nature and can badly affect the reputation of the gallery and its author, the results of auctions are in plain sight and it is impossible to hide them. Thus, auctions have very limited "curatorial" manoeuvres, which makes them adhere to more conservative and predictable strategies. It is not surprising that in the catalogues of trades of different auction houses, held at approximately the same time, appear the same names of authors. The auction is characterised by monotony, which brings profit, rather than an attempt to demonstrate an actual cross-section of the specifics of contemporary art.

Another institution that fulfils the role of an arbiter of the art world are biennales. At first glance, they do indeed look like independent non-commercial exhibitions, representing a cross-section of the life of the progressive art world. But on closer inspection, it becomes apparent how they are used by galleries as advertising platforms. Placing an artist's work in the main project of the Venice

Biennale or the national pavilion dramatically accelerates the growth of prices for his art and increases the authority of the gallerist; in professional circles this phenomenon is called the “biennale effect”. A similar effect can be achieved by organising the participation of a curated author in the exhibition of a famous museum (Tate or MoMA).

The Venice Biennale, despite positioning itself as an unbiased expert institution, is one of the most powerful signalling systems of the art market. Olav Welteis explains how the negation of the ‘commercial’ has the opposite effect of increasing commercial interest. The key to understanding the nature of this effect lies in Pierre Bourdieu’s concept of symbolic capital. Curators, critics and experts increase their symbolic capital through independent research on art history, monographs and participation in museum projects. Their demonstrative disregard for participation in active art market activities and the commercial aspect of their work ensures their status as independent and objective experts, and their opinion about the artist is the result of purely scientific research. But sooner or later symbolic capital is transformed into economic capital.

The attention of experts favourably influences the reputation of the artist and, consequently, the value of his work. As recently as 30 years ago, inclusion in the main programme of a biennale was the apotheosis of the career of an established and well-known artist, and therefore did not lead to dramatic price hikes for his works. But as the demand for contemporary art increased in the 2000s, the number of biennials grew exponentially, becoming a competition for curators to find new talent. Many of their protégés may not yet have an established style and a regular audience, so prices for their work are very low. For investors, investing in this category of authors is interesting as a speculative investment: despite the high risks, with a low entry threshold, these investments can in the short term exceed the initial costs many times over.

More and more rarely at the Biennale there are works made in traditional techniques that have allegedly compromised their connection with the art market. Contemporary art often resorts to innovative art practices that are difficult to sell, yet their creation (due to their technological complexity and cost) may well be paid for by gallerists, especially if the project is exhibited in a prestigious museum or biennale. These two institutions, due to their limited budgets, are often unable to pay for insurance, installation, transport and creation of new works, and therefore become financially dependent on galleries.

The commercial fair in Basel and the non-commercial Biennale in Venice have more similarities than differences on closer inspection. Their geographical and temporal proximity makes them a promotional showcase for the global art market: these international events showcase local art markets on their stands, which leads us to the notion of “glocality”. In addition, both institutions are coherent

mechanisms of consumer culture, turning the exhibition into entertainment and a demonstration of their status, as they represent a set of events, some of which are open to a wide audience and others accessible only to a limited number of people.

References

1. *Arutyunova, A.G. Art-market in the XXI century : The space of artistic experiment / A.G. Arutyunova - M. :Publishing house of HSE, 2020. - 232 p.*
2. *Belkevich, D. Report Art Basel & UBS 2021: art fairs [Electronic resource] / D. Belkevich // Artinvestment. - 2021. - Access mode: https://artinvestment.ru/invest/analytics/20210330_BaselFairs.html.*
3. *Thompson D., How to sell for \$12 million the stuffed shark / D. Thompson ; transl. from Engl. by N. I. Lisova. - SPb. Azbuka, 2008. - 440 p.*

全媒体时代特色小镇视觉形象塑造策略
**STRATEGIES FOR SHAPING THE VISUAL IMAGE OF
CHARACTERISTIC TOWNS IN THE ALL-MEDIA ERA**

Zhu Chuan-Die

Master's degree student

College of Architecture and Art, Dalian University of Technology

Zhang Geng

Master's degree student, Associate Professor

College of Architecture and Art, Dalian University of Technology

抽象的。党的二十大报告提出“乡村振兴是全面建设社会主义现代化国家的重大历史任务”。特色小镇作为新型城镇化与乡村振兴结合的重要节点，逐渐成为全面推进乡村振兴的重要新兴力量。同时，全媒体时代的到来带来了全新的活力。到城市。文章针对小镇文化特色建设的迫切需求，将全媒体理念引入视觉传达设计领域，并以大连市王家镇特色小镇为例，提出全媒体特色小镇建设的指导策略。——特色小镇视觉形象设计领域的媒体，构建特色小镇新形象。

关键词：全媒体；特色小镇；视觉形象；乡村振兴。

Abstract. *The report of the 20th Party Congress puts forward that “rural revitalization is a major historical task for the comprehensive construction of a modern socialist country”. Characteristic towns, as a crucial junction combining new urbanization and rural revitalization, have gradually emerged as an important and emerging force in the comprehensive promotion of rural revitalization. At the same time, the advent of the all-media era has brought brand-new vitality to the cities. This paper addresses the urgent demand for the construction of cultural characteristics in towns, introduces the concept of all-media into the field of visual communication design, and takes Wangjia Town Characteristic Town in Dalian City as an example to put forward the guiding strategy of all-media in the field of visual image design of characteristic towns, so as to construct a new image of town characteristics.*

Keywords: *all media; characteristic town; visual image; rural revitalization.*

I. Background of Wangjia Town

Wangjia Town, belonging to Zhuanghe, Dalian, Liaoning Province, is an archipelago town composed of islands, lumps and reefs, carrying rich historical and

cultural qualities and regional humanistic advantages. As one of the representatives of Dalian's characteristic towns, it shows a new mode of combining urban development and rural revitalization. It has superior location conditions, unique island resources, and skillful combination of landscapes, which are its distinctive town personality and language, providing a good resource base for the development of tourism. In 2020, Wangjia Town was selected into the list of Liaoning provincial leisure agriculture and rural tourism characteristic townships. Wangjia Town, as one of the characteristic towns in Dalian, has unique and rich cultural resources.

II. The visual image shaping strategy of Dalian characteristic towns in the context of all media

The image of the town originates from the refinement of its own characteristics, and then transformed into a highly dynamic communication symbols, which is a cultural memory symbol shared by the audience and the town, and an important business card reflecting the cultural connotation of the city.^[1] Wangjia Town lacks a systematically integrated visual cultural image that represents its uniqueness. The promotional efforts for its cultural characteristics are insufficient, and the media communication forms are limited. The expression of its cultural characteristics in relation to local industries is not prominent. Additionally, the town lacks a distinct cultural brand that embodies its unique features. Aiming at above-mentioned problems, this paper puts forward a systematic methodology, which can be summarized into the following three levels of design strategies:

(i) Create a characteristic town cultural brand

Dig the regional characteristics deeply, build the characteristic cultural brand, and enhance the cultural taste of the city. The characteristic town of Wangjia Town is a town with rich history and unique regional culture. It has numerous cultural resources and a unique geographic location. The town culture can be shown in the way of shaping the characteristic brand. For example, in the development of characteristic towns, there are some towns that utilize the brand effect to the fullest extent, and the "Grape Culture Festival" in Dalian is one of them. Zhaomengou Village in Dalian began to build its own special brand activities in 2019, hosted three "Ganjingzi District Grape Culture Festival", four "Zhaomengou Village Cherry Festival" and a series of brand activities. The successful holding of these brand activities has made the grapes and cherries in the village of Zhaomengou famous, and the brand image is gradually gaining popularity. Therefore, the characteristic brand is very important for the promotion of characteristic culture and economy. Therefore, in the visual image design of characteristic towns, towns

¹ Tosongfang, Zhang Wengang. The Construction and Communication of Historical and Cultural City Image in the All-Media Era[J]. News Knowledge; 2012(12). 户松芳, 张文刚. 全媒体时代历史文化型城市形象的建构与传播[J]. 新闻知识; 2012(12).

in Dalian should highlight the characteristics and elements of regional culture to emphasize the uniqueness.

Wangjia Town, as the only island town in Liaoning Province composed entirely of archipelagos in the sea, can extract the traditional architecture, folk culture, landscape and other elements of the region, and utilize the form of morphological features combined with modern design techniques to create a recognizable and attractive brand image.

(ii) Diversification of communication media for shaping the town's visual image

In the all-media era, the visual image of the town needs to be adapted to the display needs of different media platforms. Considering that people use various devices and platforms to obtain information, the visual image design should have diversity and adaptability. For example, Among Wangjia town scenic spots, Haiwangjiudao Island, is a key natural landscape scenic area belonging to Dalian, which has beautiful natural scenery. However, Haiwangjiudao Island is a kind of the bedrock coast in the category of erosion coast. Around the island, wave action is strong, erosion is more serious. And Haiwangjiudao Island also exists in the lack of publicity, a single form of communication and other issues. Therefore, it is imperative to implement digital protection. For the current difficulties faced by Wangjia Town and Sea King Nine Islands, can use diversified communication media to improve the existing problems, such as e-commerce platforms, VR interactive experience, live broadcasting, short videos and other forms, We expect to follow the pace of the times, enrich the form of dissemination and publicity, shape the town's visual image of the diversification of communication media and highlight the interactivity of the public space. Diversified media communication of town culture can enhance the popularity of town culture and increase the expressive power of town culture, thus attracting more audiences and promoting the development of towns.

(iii) The construction of empathic field

The theory of empathy, proposed by Rogers, the founder of humanism, refers to people's emotional resonance and understanding through perception and experience. It helps to facilitate communication and sharing of information, and enhances emotional identification with each other. The empathic field construction can adopt an all-media perspective, by integrating historical and cultural qualities into the visual image design. Traditional communication media such as slogans, display boards and printed materials still play an important role, but the application of modern media makes the empathic approach more diversified. By combining elements such as images, text, audio and digital technology, a three-dimensional and interactive empathic field is created, further enhancing the public's emotional connection and engagement with characteristic towns. In addition, organizing reg-

ular cultural activities and brand celebrations to attract public participation at different levels can create an empathic field for sharing emotions and communicating with each other, strengthen the emotional connection between the public and the featured town, and enhance the public's sense of identification with the featured town. Particularly, for the construction of empathic field of Wangjia Town as a characteristic town, we should pay attention to the excavation and integration of cultural forms and cultural memories with historical and cultural qualities. The historical development context, ancient buildings, tourism culture, scenic spots and characteristic industries of Wangjia Island Town are integrated into the relevant cultural memory. And at the same time, by adopting a full-media perspective and taking advantage of traditional communication media such as image, text, audio, and the modern media elements such as digitized technology, an immersive sympathetic field with experiential and visual features can be created. We can not only protect the characteristic culture of Wangjia Town, but also improve the public's cognition and emotional participation in Wangjia Town's characteristic towns, and thus strengthen the foundation of the town's sustainable development.

III. Conclusion

As the only island town in Dalian, Wangjia Town has rich cultural resources and cultural characteristics. Under the perspective of the all-media era, the overall visual image of Wangjia Town as a characteristic town creating characteristic cultural brands, promoting multi-media communication, and constructing a sympathetic field to enhance the visual image of the town and the popularity of its culture, so as to promote the rapid development of regional towns and cities, and assist in rural Revitalization.

References

1. *Working Group on Renewal of Shanghai Library's Visual Identity System. Reinventing the image of public libraries in the all-media era--documentary and reflection on updating the visual identity system of Shanghai Library*[J]. *Library Journal*;2022,41(06):15-23. 上海图书馆视觉识别系统更新工作组. 全媒体时代下公共图书馆形象的重塑——上海图书馆更新视觉识别系统的纪实与思考[J]. 图书馆杂志; 2022, 41 (06) :15-23.
2. *Zhou Fengnian, Yu Luhong. Characteristic city culture branding in the context of the wisdom era*[J]. *News Communication*;2022,(19):7-9. 周逢年, 俞律弘. 智慧时代背景下的特色城市文化品牌塑造[J]. 新闻传播; 2022, (19) :7-9.
3. *Bao Shangyou, Ai Pengda, Sun Fuyou. Haiwang Jiudao gets on "ecological cruise ship"*[J]. *Agricultural Market Weekly*; 2016-06-24. 包尚友, 艾鹏达, 孙福有. 海王九岛搭上“生态游轮”[J]. 农产品市场周刊; 2016-06-24.

4. TU Songfang, ZHANG Wengang. *The construction and dissemination of historical and cultural city image in the all-media era*[J]. *News Knowledge*; 2012(12). 户松芳, 张文刚. 全媒体时代历史文化型城市形象的建构与传播[J]. 新闻知识; 2012(12).

功率动力学分析模型

THE ANALYTICAL MODEL OF POWER DYNAMICS

Carikovs Olegs

Doctor of Economic Sciences, Director

Baltic Information Security Centre (Latvia)

注解。 本文提出了同质民族社会体系中政治权力建立和划分的数学模型, 并确定了其动态平衡的条件。 分析分析可以确定寡头政治和独裁统治取代民主权力制度的条件, 并确定现代政治结构未来发展的前景。

关键词: 权力、合法性、不稳定、优化、政治竞争、声望、均衡、发展、民族社会体系、精英。

Annotation. This article presents a mathematical model for the establishment and division of political power in a homogeneous ethno-social system and determines the conditions for its dynamic balance. Analytical analysis makes it possible to determine the conditions for the replacement of a democratic system of power by oligarchy and autocracy, as well as to identify the prospects for the future development of modern political structures.

Keywords: power, legitimation, instability, optimization, political competition, prestige, equilibrium, development, ethno-social system, elite.

“Power is easier taken than kept”

(N.Machiavelli)

In the process of its development every ethno-social system is constantly making choices, undertaking various political, economic, cultural actions. Only a few of its representatives are able to reasonably assess the necessity, benefits and dangers of specific steps. Consequently, the information limitation of most elements of the community, society and civilization is a threat at both individual and collective level. Over the centuries, elites have constantly learned to make decisions and assess opinions based on a variety of criteria of credibility. The evaluation of their performance is shaped by the level of recognition (respect) by society for a particular professional and the evaluation of their creativity. In most cases, it is a consequence of making decisions in new unrecognised and/or unappreciated situations. The fate of many, sometimes all, often depends on how a particular leader,

professional or their group is “respected”. This “experience” in the context of permanent problem-solving, superimposed on the desire to retain power, is highly varied and most often tragic.

The consolidation of power has always led and leads to a gradual reduction of individual rights and their restrictive unification. Entered the state service, the individual is transferred to a specific environment, where he loses his independence, becoming a cog in the bureaucratic system.

Even when power does not take over the function of managing production, the act of withdrawing and redistribution part of the surplus product for public needs requires a management mechanism. As a consequence, every ethno-social system contains a management circuit of varying complexity. From ancient times to the electoral institutions of modern times, its aspiration, in one way or another, to justify its legitimacy - a strong, lasting legitimised right to power - has been an important condition for the emergence of the state.

The universal readiness to submit within a complex, multi-stage hierarchy of groups and communities is not at all sufficient for the formation of institutions of power. As a consequence of the contradictions between them, the internal tensions within the ethno-social system, associated with the increasing use of violence, are constantly increasing. This leads to competition and the establishment of relations of subordination. Within such a system, power and status transcend their functions and give rise to a system of cooperation between independent individuals or their groups for their subsequent gain. Such factors as power, status and privileges, reflected in the irrational attitude of a part of society mixed with envy of their bearer, form its prestige. To exclude situations of uncertainty within the large structure and even outside it, where familiarity in person is no longer possible, expressive means or signs are formed to enable members of the community and even outside the hierarchy to mark the status of the bearers of power.

The need for the ethical perception of the bearers of power (personified or imagined) by the rest of society stems from the deepening conflict between the elements of the system and/or in the presence of danger from outside. The process of recognition by social actors of the significance of socio-political reality, both as a whole and in its individual manifestations and components, is defined as legitimation. This phenomenon refers to the recognition by society of the institutions of power that are given the right to make decisions on its behalf and to establish legal norms.

In one case, the legitimation takes place through voluntary consent and in another case it takes place externally through violence. “Voluntary legitimation” is based on three main principles: the charisma of the leader, tradition and rational management practices. From a systemic point of view, it is a process of mutual synchronisation of the elements of the system, some of which begin to act as con-

trol units. “Forced” legitimisation is an external synchronisation and is carried out by an already existing governance subsystem on the basis of existing legal norms. In the process of legitimation, the ultimate object of usurpation of supreme power becomes the realm of tradition and law, and the direct consequence is the appropriation of fiscal-police functions.

The history of crises, of which internal conflicts and wars that disrupt the need for security are a major part, highlights the important, though controversial, role of historical figures who led different social movements and power and military structures. The well-documented factual material shaped the notion of “freedom of choice” among early classical historians. The known variability in the behaviour and practical thinking of historical figures is particularly noticeable in the ancient world, feudal Europe, where numerous documental records have survived of the diversity of their decisions and actions. Almost all “great” personalities are characterised by a high level of their needs, primarily respect, close to narcissism and known as “megalomania”. When a member of a ruling dynasty or other charismatic personality reaches a certain level of power, they have more freedom in relation to society as a whole and individually. Even the mistakes they make are seen as ‘freedom to err’. This notion still exists today and is seen as an inherent part of freedom of choice, which allows politicians to avoid punishment for outright failures of their policies.

The increasing role of the individual in the historical process reflects the development of social structures and their quantitative and qualitative growth. Under the conditions of an unstable state of an ethno-social system, the creative activity of a particular individual or their group can influence and even change the direction of its development. Thus a dilemma arises: if an individual has provided the best solution to a topical problem and society has supported it, is this an individual merit or the result of collective action? At the same time another question arises: is it possible that there was an alternative solution and another candidate? It seems that the historical process, as a multiplier of the activities of many people, “works out”, corrects these errors according to the needs of society. In this sense, it is an balancing feedback, in the form of a system of social regulation.

According to M. Weber’s definition, the legitimation is a process of recognition by social actors of the significance of socio-political reality, both as a whole and in its individual manifestations and components. It is a set of two elements. The first consists in establishing direct links between representatives of power and the rest of society. This practice gives the latter a vague hope of integration into the ruling elite through kinship, economic or personal ties. As the social division of labour deepens, political, professional or other non-romantic reasons come to the fore, which take into account the balance of power and wealth of potential partners.

The other side of legitimism is the institutions of redistributions of the gross social product. At an early stage of social development these were military trophies and tribute, and at a later stage - sinecures, financial and social benefits. By distributing offices, gifts and titles of honour to his retainers, the suzerain increased his political influence and prestige by acquiring the image of a "generous ruler". At the same time, he tied his recipients to the 'obligation' of giving, which could be done in various ways. Depending on their inclinations, they could do so in two ways: to satisfy personal needs or to enhance their status. The recipients' authority was generally reinforced in three ways - by redistributing the bounty they received, by social activism and by using the charisma of a higher authority to demonstrate it.

Taking advantage of the institutional isomorphism of social systems, the principle of criterion convolution. This allows us to use a model of collective behaviour to qualitatively describe power struggles with the following rules:

I. There are n subjects competing for power in a homogeneous ethnosocial system. Total volume of power resource in the system is constant and equal to 100%.

II. Each of the contenders j obtains benefits g_j from possessing of fullness of power .

III. All subjects act rationally, i.e. they maximize their benefits. At each stage rival j seeks such a share of power from which they expect to gain maximal benefit.

IV. The prestige of each rival is characterised by the parameter $0 < \alpha_j \leq 1$ determined by the institutional matrix of the system. Let us nominally call it the institutional attractiveness of the subject.

V. At each stage of rivalry subject j advances a part of its resource $x_j \geq 0$, $x_j \geq 0$, acquired at the previous stage, that is, it provides institutional security. Its value determines the share of power at that stage and cannot be returned or postponed in any way. It is compensated from the benefits of the current period only. If one of the rivals fails to compensate during the rivalry process, it is eliminated from the power struggle.

VI. Rivals cannot collude with each other.

A study of the properties of the model in [1,2,3] has shown that the necessary and sufficient condition for asymptotic stability of the equilibrium state of the system is determined by the inequality $|2 - n| < 1$, from which it follows that a stable power sharing is achieved only when there are only two contenders competing for it. Figure 1 illustrates the behaviour of rivals striving for the possession of an indivisible or unique resource: for example, the struggle for the crown or the election in a single-mandate constituency. In the case of a clash between two chiefs or clans, it means that any of their victories are temporary, as they lead the opposition to rally against him.

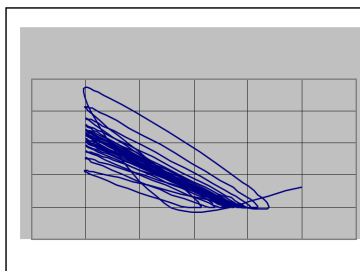


Figure 1. Competition for the possession of an indivisible resource

A competition for a power resource is futile for those of the rivals who do not possess the requisite characteristics of prestige and advantage. In the case of $\alpha_j \leq \alpha_i, g_j \leq g_i$, it is at once obvious but in the case of $\alpha_j \geq \alpha_i, g_j \leq g_i$, it is not. Hence, we can determine the condition under which the rivalry for power has a chance of success. The domain of determination of the change function of the aggregate strategies of rivals is bounded by two inequalities defining the necessary condition to achieve stability. It follows from them that $\frac{(n-1)^2}{(n-2)\beta} \geq \alpha_i g_i \geq 2 \frac{n-1}{\beta}$ either $2 \leq n \leq 3$. The aggregate $\beta = \sum_{i=1}^n \frac{1}{\alpha_i g_i}$ connects

institutional prestige α_i and political benefits g_i of all rivals and is a key characteristic that determines the behaviour of rivals.

By analysing the behaviour of each of the rivals separately, we obtain that the behaviour of rivals who always act rationally is described by an iterative procedure:

$$x_i(m) = \begin{cases} \frac{\sqrt{\sum_{j=1, j \neq i}^n \alpha_j x_j(m-1)}}{\alpha_i} \left(\sqrt{\alpha_i g_i S} - \sqrt{\sum_{j=1, j \neq i}^n \alpha_j x_j(m-1)} \right) & \text{если } \alpha_i g_i \geq \sum_{j=1, j \neq i}^n \alpha_j x_j(m-1) \\ 0, & \text{если } \alpha_i g_i < \sum_{j=1, j \neq i}^n \alpha_j x_j(m-1) \end{cases} \quad (1)$$

Moreover, the set $X^n = \{x_j; 0 \leq x_j(m) \leq g_j, j = 1 + n, m \in N\}$ is invariant with respect to procedure (1). It follows that in order to reach an equilibrium state subject i should use the strategy x_i^* , at which he achieves the greatest efficiency. By this case, the iterative procedure (1) has the same non-trivial power sharing equilibrium position

$$B_1^* \quad x_i^* = \frac{S(n-1)}{a_i} \frac{\beta - \frac{n-1}{\beta^2}}{\beta^2} \text{ provided that } n - 1 \geq 2(n - 2), \text{ i.e. at values of}$$

$n \in \{2, 3\}$. In the case the constraint takes the form of a system of inequalities

$$a_i g_i > \frac{4}{\beta}, i \in \{1, 2, 3\} \quad (2).$$

В случае, если неравенство (2) справедливо для каждого из соперников, существует область устойчивого политического равновесия. При наличии более трёх претендентов на власть её устойчивый раздел невозможен.

The prospect that one of the contenders might lose may provoke him to violate Rule III and abandon rational behavior ‘in the name of survival’. In this case, any strategy that ensures its success is justified by the victory, regardless of the cost. However, even with a temporary victory, he can only engage in further rivalry if his costs do not exceed his gains. Otherwise, the “caliph for an hour” will not be able to recoup his costs and will be excluded from the next round of the struggle for power.

Another option for the outsider is to collude with his rivals. Although in this case Rule VI is formally violated, the formation of a coalition should be regarded as the emergence of a new rival. Its emergence changes the parameters of the model, reducing the number of participants in the power struggle and hence shifting the state of equilibrium. Rejection of the rules deprives the “intruders” of freedom of choice and turns them into objects of control by their more successful rivals. Consequently, the model illustrates the process whereby the prerequisites for the formation of an oligarchy, which absorbs the ‘outsiders’ and is realised in the form of a triumvirate or duumvirate. A third choice of outsider behavior may be to permanently rebrand it. To do this, he needs constant replenishment from outside the system, which makes him dependent on an external sponsor.

The establishment of a duumvirate implies that each of the rivals’ aspirations for dominance turns out to be detrimental to them. A stable equilibrium is characterised by inequality $1 \leq \frac{\alpha_1 g_1}{\alpha_2 g_2} \leq 4$ and means that a compromise between two rational rivals is inevitable and predetermined. Its existence is a necessary and sufficient condition for stable power sharing.

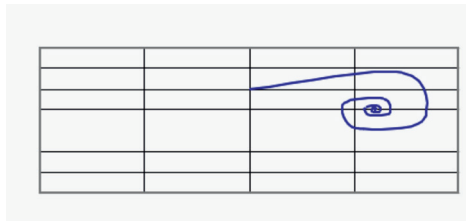


Figure 2. Reaching an equilibrium at diarchy

Figure 2 illustrates the transition of power sharing from one state to another. In this case, there is a process that makes it possible to clearly define a strategy

of struggle for power. It follows from (2) that a stable division of power between three subjects (triumvirate) occurs when the characteristics of the weakest rival in relation to the dominant are 2 to 3.

The model of representative democracy implies a more complex system of relations between the elite and society, as the social programme of each political actor implies the implementation of activities according to the 'principle of justice'. It can take various forms, but in the end it is a redistribution of the surplus product withdrawn by power among all members of society, not just political associates. In this case, the prestige and the benefit of the subject i are determined by the expressions $\alpha_i = \alpha_i \frac{c_i}{p}$, $g_i = p - c_i$, where p - is the share of the national product withdrawn by the state, and c_i - is the amount of funds allocated to social programmes. The aggregate characteristic is $\alpha_i g_i = \alpha_i c_i (1 - \frac{c_i}{p})$. Let $\varepsilon_i = \frac{c_i}{p}$ - be the share of social programmes of a particular agent. It can be shown that under the conditions of struggle for power half of the product withdrawn by the state is directed to social needs $\forall i, \varepsilon_i = \frac{p}{2}$. In this case the conditions for the emergence of oligarchy are simplified and take the form of $\frac{\alpha_1}{\alpha_2} \leq 4$ при $n = 2$ и $\frac{\alpha_1}{\alpha_3} \leq 1.5$ при $n = 3$.

Since antiquity the antagonism of two parties for a resource is observed rather seldom: at their skirmish, as a rule, there is a third force pursuing its own interests. This situation can be traced back to ancient times, when Egypt, Babylonia and the Hittite empire dominated Bronze Age Western Asia. Three Diadochian states were formed on the ruins of Alexander's empire and Charlemagne's empire split into three parts, from which France, Germany and Italy later emerged. The Hellenistic world was the third power during the Punic Wars, Byzantium during the Crusades, and Russia during the Anglo-French rivalry. After the Napoleonic wars the tripolar world was an everyday occurrence until the middle of the 20th century, and only World War II made it bipolar.

Hahnemann's model of violent establishment of power connects its prestige, legitimacy and external conflict. It assumes that the desire of the elite to wage war is directly proportional to the difference between the desired level of legitimacy and its current value. For any given level of conflict, the degree of success is proportional to the subject's power $x_i, i = 1, n$ compared to the combined power of his rivals. Its prestige π_i is proportional to the share of the acquired resource V_i : $\pi_i = \frac{V_i}{S}$, and the legitimacy λ_i is determined by the acquired prestige and varies from 0 to 1 with a certain lag. Δm

Military power ψ_i can be defined as the ratio of rival strategies, i.e. and the level of conflict is proportional to the number of rivals and the experience accumulated in the previous stages of the rivalry. Thus, adapting the model of collective behaviour to Hahnemann conditions, we obtain at step $m+1$ the following system of equations:

$$K_i^m = (1 - \lambda_i^m) \frac{\sum_{j=1}^n \theta_j^m}{n}, \quad \pi_i^m = \frac{V_i(m)}{s} = \frac{\alpha_i x_i(m)}{\sum_{j=1}^n \alpha_j x_j(m)}, \quad \lambda_i^m = \pi_i^{m-\Delta m} \quad \text{и} \quad \theta_i^{m+1} = \psi_i^m K_i^m,$$

$\forall i, i = 1, \dots, n.$

Repeating the previous reasoning, we obtain for the equilibrium condition:

$$\lambda_i = \lambda_i^m = \pi_i^m = \frac{n-1}{\beta \alpha_i \theta_i} \quad \text{and} \quad \psi_i^m = \frac{\frac{n-1}{\beta \alpha_i \theta_i}}{\sum_{j=1}^n \frac{1}{\alpha_j \beta (\frac{n-1}{\beta \alpha_j \theta_j})}} = \frac{\lambda_i}{\sum_{j=1}^n \frac{\lambda_j}{\alpha_j}}. \quad \text{It follows that}$$

$$\theta_i^{m+1} = \frac{\lambda_i}{\sum_{j=1}^n \frac{\lambda_j}{\alpha_j}} (1 - \lambda_i) \frac{\sum_{j=1}^n \theta_j^m}{n}.$$

To simplify the analysis, let us introduce the total experience characteristic $\theta_m = \sum_{j=1}^n \theta_j^m$. Its domain of determination is the set of positive numbers ($\theta_m > 0$). Thus, the iteration procedure for the Hanneman's model takes the following form:

$$\theta = \sum_{i=1}^n \frac{\theta}{n} \frac{\lambda_i}{\sum_{j=1}^n \frac{\lambda_j}{\alpha_j}} (1 - \lambda_i) \quad \text{From} \quad \theta' = \theta_{m+1} = \theta_m, \quad \text{we receive} \quad \theta_{m+1} = \sum_{i=1}^n \frac{\theta_m}{n} \frac{\lambda_i}{\sum_{j=1}^n \frac{\lambda_j}{\alpha_j}} (1 - \lambda_i)$$

or
$$\sum_{i=1}^n \lambda_i (1 - \lambda_i) = n \sum_{j=1}^n \frac{\lambda_j}{\alpha_j} \quad (3)$$

Equation (3) establishes the relationship between the legitimacy and social prestige of each of the contenders, and their number. From it, we can determine the condition under which the legitimation of power takes place. After a certain time there are only two or three contenders for power. The victory of one of them will be predetermined if the equilibrium condition does not satisfy the inequality (2) for the cases of $n \in \{2, 3\}$. Let us denote the relation $\frac{\alpha_2}{\alpha_1} = \alpha$. Hence it follows that

for the dominant subject it will always be true if $\lambda_2 < \frac{1}{2\alpha}$.

The condition that the characteristics of the second challenger must satisfy arise from inequalities (2). It follows that $\alpha > 2 - \frac{\theta_2}{\theta_1}$. Thus, to achieve equilibrium in a forceful confrontation with a stronger adversary, the inequality $\frac{\theta_2}{\theta_1} \geq 1.6$. This means that in order for the force conflict to continue, the subject of lower institutional prestige must give up some of its own consumption in the struggle for power. Under certain circumstances, this creates the seesaw effect illustrated in Figure 3. Otherwise, if $n \rightarrow \infty$ a threat of resource depletion appears and the loss of the weaker rival.

The concentration of full power in the hands of the winner changes the paradigm of the political system, replacing efficiency with stability. Resource depletion and increasing number of structural breaks grows in an avalanche, provoking a strengthening of the bureaucracy. This requires an increase in the share of redistributable social product and, according to Parkinson's law, contributes to the growth of intra-system costs, causing another round of taxation. Reaching a critical value leads to the slowing down of the development of the ethno-social system, its weakening and decay.

References

1. Carkovs Oļegs. *Historical Dynamic Modeling (Simulation Experience) Signal Processing and Vision International Conference on Signal Processing and Vision (SIGV 2022) December 17 ~ 18, 2022, Dubai, UAE ISBN: 978-1-925953-82-4* ·
2. Carkovs Oļegs /Tsarkov Oleg. *The equilibrium stability of the competition in quantities. Bydgoszcz, Ryzyko: Zarzadzania ryzykiem w przadsieborstwie, REKPOL ISBN 83-915990-9-4, 2008, pp.97-110.*
3. Carkovs Oļegs /Царьков О.Е. *Катастрофы и хаос как объекты экономического управления. Большая Евразия: Развитие, безопасность, сотрудничество. Ежегодник. Вып. 3. Ч. 1. Материалы XIX Национальной научной конференции ... РАН. ИНИОН. – М., 2020. – 958 с. ISBN 978-5-248-00956-5 · May 9, 2021*
4. Parkinson, Cyril Northcote, *Parkinson's Law, or The Pursuit of Progress, 1957/ Паркинсон С. Н. Законы Паркинсона: Сборник: Пер. с англ./ Сост. и авт. предисл. В. С. Муравьев. — М.: Прогресс, 1989. — 448 с. ISBN 5-01-001583-8*
5. Robert A. Hanneman, Randall Collins and Gabriele Mordt. *Discovering Theory Dynamics by Computer Simulation: Experiments on State Legitimacy and Imperialist Capitalism Sociological Methodology. Vol. 25 (1995), pp. 1-46 (46 pages). Published By: American Sociological Association*
6. Treiman D.J. *Occupational prestige in comparative perspective, New York, Academic press, 1977.*
7. Weber M./Вебер М. *Wirtschaft und Gesellschaft, Tübingen, 1922./Избранные труды. М.: Прогресс, 1990.*

DOI 10.34660/INF.2023.18.55.110

俄罗斯分离的假结核菌株的种内遗传分化
**INTRASPECIFIC GENETIC DIFFERENTIATION OF
PSEUDOTUBERCULOSIS STRAINS ISOLATED IN RUSSIA**

Meloyan Misak Gevorgovich

Research Assistant

*Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor*

Vodopyanov Aleksei Sergeevich

Candidate of Medical Sciences, Senior Research Officer

*Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor*

Trukhachev Aleksei Leonidovich

Candidate of Medical Sciences, Senior Research Officer

*Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor*

注解。假结核病的诊断是目前我国的一项紧迫任务，不同地区定期出现该病的暴发，主要发生在17岁以下的儿童年龄段。俄罗斯联邦和世界其他国家分离的假结核杆菌菌株具有广泛的遗传多样性，并具有不同的毒力和流行危险。研究假结核病原体基因组的遗传组织有相当有效的方法。然而，简单易行的基因分型方法并不总是能够有效地区分不同疫情中密切相关的菌株。为了解决这些问题，需要开发不同类群假结核菌株遗传分化的新方法，以及多种基因分型方法的综合使用。更完整的基因护照允许获得有关分离菌株的最新信息。我们研究的目的是使用 PCR INDEL 分型方法对在俄罗斯联邦境内分离的假结核杆菌菌株进行种内遗传分化。在假结核杆菌菌株的基因组中检测到 7 个 INDEL 标记，作为基因分型的目标。使用 INDEL 标记将 58 个假结核杆菌菌株基因组分为几种 INDEL 类型。

关键词：假结核病原菌、假结核耶尔森菌、基因分型、分析、INDEL 标记。

Annotation. *Diagnosis of pseudotuberculosis is currently an urgent task in our country, in different territories of which periodically register an outbreak of this disease, mainly in the age group of children under 17 years. The strains of Y. pseudotuberculosis isolated in the Russian Federation and in other countries of the world are characterised by a wide genetic diversity and have different virulence and epidemic danger. There are quite effective methods for studying the*

genetic organisation of the genomes of pseudotuberculosis pathogens. However, not always simple and accessible genotyping methods can effectively distinguish closely related strains from different outbreaks. To solve these problems, it is necessary to develop new methods of genetic differentiation of different groups of pseudotuberculosis strains, as well as the integrated use of several genotyping methods. More complete genetic passportisation allows obtaining up-to-date information on isolated strains. The aim of our study was intraspecies genetic differentiation of *Y. pseudotuberculosis* strains isolated in the territory of the Russian Federation using the INDEL-typing method by PCR. Seven INDEL markers were detected in the genomes of *Y. pseudotuberculosis* strains, which served as targets for genetic typing. The use of INDEL markers separated 58 genomes of strains of *Y. pseudotuberculosis* into several INDEL-types.

Keywords: pseudotuberculosis pathogen, *Yersinia pseudotuberculosis*, genotyping, analysis, INDEL markers.

Introduction

Pseudotuberculosis is an infectious disease whose causative agent is *Yersinia pseudotuberculosis*. The disease is registered in all countries of the world; in various regions and climatic zones. In the territories of the Russian Federation for many years there is a marked variability in the intensity of the epidemic process of pseudotuberculosis [1]. In 2021, large outbreaks of pseudotuberculosis were registered in Tomsk and Krasnoyarsk. In addition to the damage to public health caused by the bacteria *Y. pseudotuberculosis*, the pathogen is distinguished by a wide range of antigens, plasmid and chromosomal virulence determinants, which together determine a variety of clinical manifestations and set the laboratory service the task of developing an effective method of genotyping that allows timely determination of the genetic organisation of the pathogen [2, 3, 4]. For genotyping of *Y. pseudotuberculosis* strains, a variety of molecular biological methods are currently used. Previously, the INDEL-typing method was successfully applied for genetic intraspecies differentiation of *V. cholerae* [5] and *Y. pestis* [6]. The proposed approach is based on the use of INDEL markers that include mutations carrying insertions or deletions in chromosomal genes. The obtained set of INDEL-markers makes it possible to assign a strain to a certain genetic group (INDEL-type) and to characterise the differences between strains. The advantage of this method is its availability and the possibility to use it at any stage of laboratory research. In addition, once INDEL-types are determined in pseudotuberculosis strains, phylogenetic analysis is possible using this method.

The aim of the work is to analyse the genetic diversity of *Y. pseudotuberculosis* strains isolated in Russia on the basis of INDEL markers detection.

Materials and methods. The strains of *Y. pseudotuberculosis* isolated in Russia were selected for the study.

Y. pseudotuberculosis strains isolated in Russia during outbreaks and from the external environment at different times: Tomsk and Krasnoyarsk in 2021, Zima in 1999, Novy Urengoy in 2007, St. Petersburg in 1981 and 2000. Strains were isolated from patients and from the external environment. A total of 58 isolates were included in the analysis.

INDEL markers were detected using the author's programme GeneExpert. Phylogenetic analysis was also performed using the author's software Astrolabe using the UPGMA method.

In silico PCR was performed using the author's VirtualPCR programme [23]. *In vitro* PCR analysis of the studied strains using primers designed and synthesised in this work was carried out in a standard set of reaction mixture, using the temperature regime, which was determined based on the structure of the synthesised primers.

Results and discussion

Comparative analysis of the complete assembled genomes of 22 *Y. pseudotuberculosis* strains from the NCBI database allowed us to select 7 genes that contained indel mutations that differed from strain to strain. Variable regions of these genes containing indel-mutations were used as INDEL-markers. To detect these markers, 7 primer pairs were designed. The result of tests of different strains of *Y. pseudotuberculosis* in PCR with the proposed primers was the registration of a set of DNA fragments differing in length. The analysis of the amplicon structure did not reveal any sequences of variable tandem repeats that could potentially cause differences in amplicon values. A specific set of amplification fragments was obtained for each strain, allowing the strains to be separated into INDEL-types. Earlier *in silico* PCR analyses of 308 genomes of *Y. pseudotuberculosis* strains in the NCBI Internet database revealed variants of amplicon sets corresponding to 30 INDEL-types.

The 60 strains studied were represented by isolates isolated in Russia from field material and from patients. INDEL-typing of these strains by *in vitro* PCR and 10 strains from the NCBI database by *in silico* PCR allowed us to determine the main genotypes of strains circulating in Russia (Table 1). The studied strains belonged to 1, 2, 3, 4, 5, 9 INDEL-types, but the main part of strains with serotype O:1b belonged to 1 INDEL-genotype group. Strains of *Y. pseudotuberculosis* O:1a serotype belonged to groups 2 and 5 INDEL-types, and genetic group 3 united strains of O:3 serotype. It should also be noted that there was a correspondence of strain serotype and site of isolation with INDEL-type.

Table 1

Y. pseudotuberculosis strains according to their serotypes, place of isolation and INDEL-types identified.

Количество штаммов или номер штамма	Серовар	Место выделения	Год выделения	INDEL-тип
1	O:1a	Saint-Petersburg, Russia	n/a	2
12	O:1b	Saint-Petersburg, Russia	2000	1
1	O:1a	Zima, Russia	1998	5
9	O:1b	Zima, Russia	2000	1
9	O:1b	Zima, Russia	1999	1
1	O:1b	Gorno-Altai, Russia	1993	1
1	O:1a	Veliky Novgorod, Russia	n/a	2
8	O:1b	Tomsk, Russia	2021	1
9	O:1b	Krasnoyarsk, Russia	2021	1
9	O:1b	Novy Urengoy, Russia	2007	1
3*	O:3	Stavropol region, Russia	1940-61	3
2*	O:3	Leningrad region, Russia	1955	3
B-7194*	O:1b	Russia	n/a	4
B-7195*	O:1b	Russia	1975	4
IP33177*	O:1b	Russia	n/a	1
IP33250*	O:3	Russia	n/a	9
1231*	O:4b	Russia	1985	1

Note * - strains from NCBI database

When analysing the results, correlations between Russian and strains isolated in other countries were identified. Most of the Russian strains isolated in recent years from patients and belonging to serotype O:1b belong to the same INDEL type 1 and have close phylogenetic relationships with Asian strains. O:1a serovar strains isolated in Russia fell into genetic clusters containing European strains. In addition to one Ukrainian strain, Russian strains IP33111 360, IP33122 715, and strain IP33163 525, which fell into another genetic cluster containing strains from Germany, Italy, and Turkey, can be classified as European-type strains. Two strains R819 and MW109-2 from Japan, which belong to the species *Y. similis* and are in the same INDEL group and in the same cluster on the dendrogram.

Conclusion

The results show that genetic differentiation using INDEL markers can be used for genotyping. The efficiency of the developed INDEL-typing method was demonstrated by analysing 58 strains isolated during 7 outbreaks of pseudotuberculosis in different regions of our country over 40 years, including the 2021 outbreaks in Tomsk and Krasnoyarsk. Most of the *Y. pseudotuberculosis* strains

belonged to the same INDEL-type. However, strains of 2 and 5 INDEL-types were found among the strains studied, indicating that strains of different genotypes are circulating in Russia.

References

1. *On the state of sanitary and epidemiological well-being of the population in the Russian Federation in 2020: State report. Moscow: Federal Service for Supervision of Consumer Rights Protection and Human Welfare, 2021. 256 p.*
2. Fukushima H, Matsuda Y., Seki R. et al. *Geographical heterogeneity between Far Eastern and Western countries in prevalence of the virulence plasmid, the superantigen Yersinia pseudotuberculosis-derived mitogen and the high-pathogenicity island among Yersinia pseudotuberculosis strains //J. Clin Microbiol. 2001 39(10)P.3541-3547*
3. Laukkanen-Ninios R, Didelot X, Jolley KA, Morelli G, Sangal V, Kristo P, Brehony C, Imori PF, Fukushima H, Siitonen A, Tseneva G, Voskressenskaya E, Falcao JP, Korkeala H, Maiden MC, Mazzoni C, Carniel E, Skurnik M, Achtman M. *Population structure of the Yersinia pseudotuberculosis complex according to multilocus sequence typing. Environ Microbiol. 2011 Dec;13(12):3114-27.*
4. Voskresenskaya E., Savin C., Leclercq A., Tseneva G., Carniel E. *Typing and clustering of Yersinia pseudotuberculosis isolates by restriction fragment length polymorphism analysis using insertion sequences. // J. Clin. Microbiol. 2014; 52(6):1978–89.*
5. Vodopyanov AS, Vodopyanov SA, Oleynikov IP, Pisanov RV *Identification of strains of Vibrio cholera “Haitian” group using polymerase chain reaction based on INDEL-typing // M. epidem. immunol. epidemiol. Number: 3. - 2020 pp.265-270. DOI: 10.36233/0372-9311-2020-97-3-9*
6. Vodopyanov A.S., Vodopyanov S.O., Trukhachev A.L., Oleinikov I.P., Demidova G.V., Mishankin B.N. *Development of a method of differentiation of Yersinia pestis and Yersinia pseudotuberculosis on the basis of INDEL markers // Modern aspects of the study of especially dangerous and other inf. diseases: Mater. scientific and practical conf. dedicated to the 80th anniversary. RostNIPCHI. - Rostov n/D., 2014. - pp. 147-149.*

土拉弗朗西斯菌菌株系统发育分析的综合方法
**AN INTEGRATED APPROACH FOR PHYLOGENETIC ANALYSIS
OF FRANCISELLA TULARENSIS STRAINS**

Sorokin Vladimir Mikhailovich

*Candidate of Biological Sciences, Senior Research Officer
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia*

Pavlovich Natalia Vladimirovna

*Doctor of Medical Sciences, Chief Scientific Officer, Head of
Department
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia*

Tsimbalistova Marina Viktorovna

*Candidate of Medical Sciences, Senior Research Officer
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia*

注解。近年来,致力于修改现有土拉热菌菌株分化方法及其在分析不同地区传播的土拉热病原体种群的实际应用的出版物数量显著增加。尽管如此,开发区分土拉弗拉菌亚种和不同类群的方法仍然具有重要意义。本研究的目的是开发一种基于 INDEL 分型、优化一组用于 VNTR 分型的引物以及基于揭示系统发育的原始复杂方法创建的 *F. tularensis* 亚种和独立群体的方法。在俄罗斯联邦境内和世界其他地区传播的土拉弗朗西斯菌株的关系。材料和方法。创建了不同亚种土拉弗拉菌菌株核苷酸序列的本地数据库,用于对 GenBank 数据库中代表的土拉弗拉酵母基因组进行比较分析。使用 GeneExpert 程序在本地数据库菌株的基因组中检测到 INDEL 标记。使用 Primer3 Plus 和作者的 VirtualPCR 软件进行引物设计和计算机 PCR。使用 GrapeTree 软件进行聚类分析和系统发育树构建。结论。基于 canINDEL 和 VNTR 分型的综合方法使我们能够识别在世界不同地区流行的兔热病原体菌株的系统发育关系,而无需进行初步测序。目前,如果没有一套能够明确地将分离株归属于某个亚种以及亚种内归属于某个基因簇的分子生物学方法,对疾病暴发进行详细调查以确定感染源是很困难的,鉴于要求,这一点极其重要。现代公共卫生和从其他国家引入兔热病原体的真正威胁。我们提出的兔热病原体株的复杂 canINDEL 和 VNTR 分型方法为解决这一问题做出了贡献。

关键词：土拉弗朗西斯菌，亚种，INDEL，MLVA，SNP，系统发育分析。

Annotation. In recent years, the number of publications devoted to both modification of existing methods of differentiation of *F. tularensis* strains and their practical application for analysing populations of the tularemia pathogen circulating in different territories has increased significantly. Nevertheless, the development of methods for differentiation of subspecies and separate groups of *F. tularensis* is still relevant. **The aim of this study** is to develop a method of differentiation of subspecies and separate groups of *F. tularensis* on the basis of INDEL typing, optimisation of a set of primers for VNTR typing and creation on their basis of an original complex approach for revealing phylogenetic relationships of *F. tularensis* strains circulating in the territory of the Russian Federation and other regions of the world. **Materials and Methods.** A local database of nucleotide sequences of *F. tularensis* strains of different subspecies was created for comparative analysis of *F. tularensis* genomes represented in the GenBank database. INDEL markers were detected in the genomes of strains of the local database using the GeneExpert programme. Primer design and in silico PCR were performed using Primer3 Plus and the author's VirtualPCR software. Cluster analysis and phylogenetic tree construction were performed using GrapeTree software. **Conclusion.** An integrated approach based on canINDEL and VNTR typing allows us to identify phylogenetic relationships of tularemia pathogen strains circulating in different regions of the world without the need for preliminary sequencing. Detailed investigation of disease outbreaks to identify the source of infection is currently difficult without a set of molecular biological methods capable of unambiguously assigning isolates to a certain subspecies and within subspecies to a certain genetic cluster, which is extremely important in the light of the requirements of modern public health and the real threat of introduction of the tularemia pathogen from other countries. Our proposed method of complex canINDEL and VNTR typing of tularemia pathogen strains is a contribution to the solution of this problem.

Keywords: *Francisella tularensis*, subspecies, INDEL, MLVA, SNPs, phylogenetic analysis.

Introduction

Francisella tularensis, the etiological agent of tularemia, belongs to facultative intracellular pathogens that cause severe disease in many animal and human species [1] and is a category A bioterrorism agent. Currently, *F. tularensis* is divided into four subspecies: *F. tularensis* subsp. *tularensis* (*nearctica*), *F. tularensis* subsp. *holarctica*, *F. tularensis* subsp. *mediasiatica*, *F. tularensis* subsp. *novicida*, which differ in their pathogenicity and geographical distribution. All the mentioned subspecies were found to differ in their degree of genetic polymorphism.

Rarely occurring subspecies (*F. tularensis* subsp. *mediasiatica* and *F. tularensis* subsp. *novicida*) show high polymorphism, but due to the small number of strains studied, their real genetic diversity has not yet been fully explored. Dominant and highly virulent subspecies

(*F. tularensis* subsp. *tularensis* and *F. tularensis* subsp. *holarctica*) differ significantly in the level of genetic polymorphism. For example, *F. tularensis* subsp. *tularensis* is represented by two genetically distinct subpopulations (A.I and A.II) with different geographical distribution. This has been confirmed using many molecular genetic methods, including full genome single nucleotide polymorphism (SNP) analysis, analysis of canonical INDEL markers, and multilocus VNTR analysis (MLVA). In contrast, using the same methods, *F. tularensis* subsp. *holarctica* was shown to exhibit much less genetic polymorphism, which, along with its wide geographical distribution, suggests a later origin of this subspecies with further spread across the Northern Hemisphere. The development of the MLVA typing method made it possible to create tools for adequate differentiation of tularemia pathogen strains and simplified interlaboratory comparison of the obtained data. Early methods of molecular genotyping of *F. tularensis* had a number of drawbacks, namely low sensitivity, low resolution and poor interlaboratory reproducibility. The current SNP typing method requires prior DNA sequencing, which has not yet become a routine research method due to its high labour intensity and cost. An important limitation inherent in MLVA typing is the risk of erroneous estimation of relatedness between strains over large genetic distances. In addition, none of these methods provides an algorithm for differentiating *F. tularensis* subspecies. In recent years, the number of publications devoted to both modification of existing methods of differentiation of *F. tularensis* strains and their practical application for analysing populations of the tularemia pathogen circulating in different territories has increased significantly. Nevertheless, the development of methods for the differentiation of subspecies and individual groups of *F. tularensis* is still relevant [2].

The aim of this study is to develop a method of differentiation of subspecies and separate groups of *F. tularensis* on the basis of INDEL typing, optimisation of a set of primers for VNTR typing and creation on their basis of an original complex approach for revealing phylogenetic relationships of *F. tularensis* strains circulating not only in the Russian Federation, but also in other regions of the world.

Materials and methods

A local database of nucleotide sequences of *F. tularensis* strains of different subspecies for comparative analysis of *F. tularensis* genomes represented in the GenBank database was created using the author's software. INDEL markers were detected in the genomes of local database strains using GeneExpert software. Primer design and *in silico* PCR were performed using Primer3 Plus and the au-

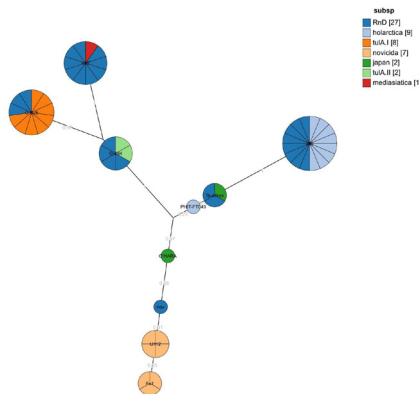
thor's VirtualPCR software. Optimisation of the primer set for VNTR typing was performed using AuSeTTS (Automated Selection of Typing Target Subsets) software. Cluster analysis and phylogenetic tree construction were performed using GrapeTree software.

Results and discussion

Earlier we presented a scheme of simplified and accelerated determination of *F. tularensis* strain subspecies by INDEL typing [3]. To select INDEL markers, we used an expanded set of strains from 29 different subspecies from the GenBank database, including a single strain of subspecies *mediasiatica* (FSC147). The main conditions for the selection of INDEL markers were a size of at least 7 bp and significance for subspecies differentiation. At the final stage, five markers were selected, which allowed us to identify 9 individual genotypes with a diversity index (DI=0.85) in 29 *F. tularensis* strains from the GenBank database. Phylogenetic analysis demonstrated the separation of subspecies *tularensis*, *holarctica*, *mediasiatica* and *novicida* into different clusters, with subspecies *tularensis* clearly divided into subgroups A.I and A.II. The *novicida* subspecies strains form a cluster divided into two groups, the three *holarctica* by *japonica* strains are represented by three individual genotypes, two of which belong to the *holarctica* genetic lineage.

For *in vitro* verification of the proposed INDEL typing scheme, 27 strains of *F. tularensis* of different subspecies from the Institute's Museum of Living Cultures (MLC) were examined by PCR using designed primers. To determine phylogenetic relationships between strains from the GenBank database and 27 strains of

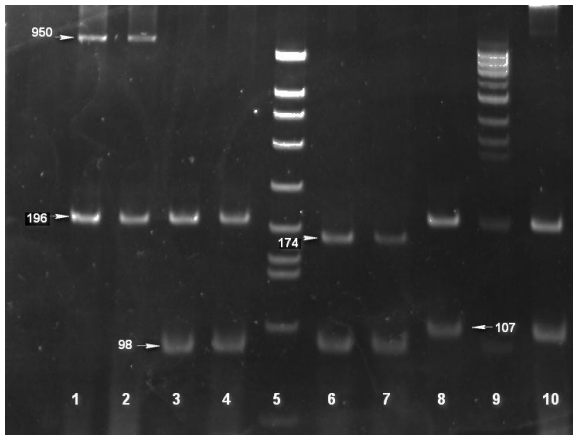
F. tularensis strains from the MML, cluster analysis of INDEL genotypes was performed and a joint phylogenetic tree was constructed (P. 1).



Picture 1. Phylogenetic tree of INDEL genotypes of 29 *F. tularensis* strains from GenBank database and 27 *F. tularensis* strains (MZhK), constructed by NJ algorithm

Thus, the INDEL genotype of all 9 strains of subspecies *holarctica* from the DOM coincides with that of strains from the GenBank database, the genotype of all 9 strains (DOM) of subspecies *mediasiatica* is identical to the genotype of the only strain from the GenBank database of this subspecies (FSC147), which confirms the isolation of strains of this subspecies. For the first time, strains of the subspecies *tularensis* (FSC) can be divided *in vitro* into groups A.I and A.II. The genotype of the two «Japanese» strains (*holarctica* by *japonica*) is identical to that of strain FSC022, representing, along with strain PHIT-FT049, a separate cluster of *by japonica*. The only strain of *F. novicida* from MJC belongs to the cluster of subspecies *novicida* strains represented by two groups of strains. It is important to note that the topology of the different subspecies fully correlates with the schemes of tularemia microbe evolution constructed earlier by analysing the gradual loss of regions of difference (RD) and by whole-genome sequencing (WGS) [4].

On the basis of these studies, we created a multiprimer PCR test for the determination of tularemia pathogen subspecies in a single reaction. Out of 13 primer pairs for INDEL marker detection, two pairs of compatible primers were selected, allowing specific detection of subspecies of the tested strains in a single reaction (Pic. 2).



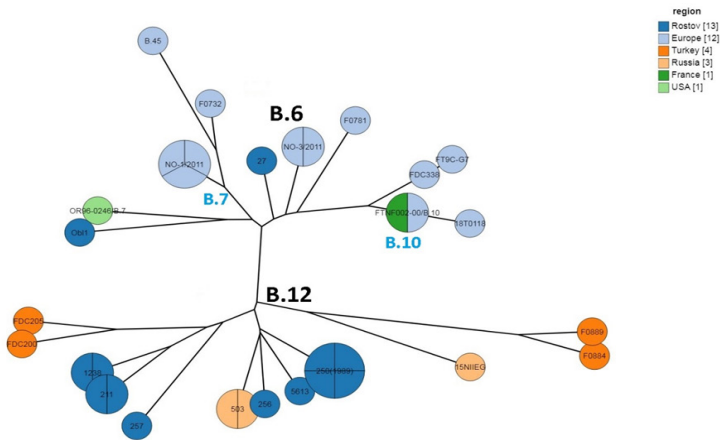
Picture 2. Differentiation of *F. tularensis* strains of different subspecies in multiprimer PCR: 1, 2 - *holarctica* subspecies, 3, 4 - *tularensis* subspecies, 5, 9 - DNA marker, 6, 7 - *mediasiatica* subspecies, and 8, 10 - *novicida* subspecies. Arrows indicate the positions of alleles 98, 107 and 950 bp for the *ft1779* gene and alleles 174 and 196 bp for the *ft426* gene. Wells 5 and 9 marker DNA.

The method is successfully used for rapid determination of subspecies of both newly isolated and museum strains of the tularemia pathogen. Thus, for the first

time we have developed a scheme for differentiation of *F. tularensis* subspecies based on INDEL typing method, which allows *in vitro* identification of both *F. tularensis* subspecies (*tularensis*, *holarctica*, *mediasiatica* and *novicida*) and groups of strains within subspecies without the need for strain sequencing.

The task of the next stage of the study was to optimise a set of primers for VNTR typing and to create, on the basis of INDEL and VNTR typing, an original integrated approach to identify phylogenetic relationships of *F. tularensis* strains circulating not only in the Russian Federation but also in other regions of the world. The development of a set of VNTR loci in the presented study was based on the typing scheme according to Vogler, 2009 [5] with 11 VNTR markers. We designed new primers to reduce the size of target fragments in order to increase the accuracy of determining the number of repeats in the indicated VNTR loci. We used the AuSeTTS programme [6] to study the correlation between Simpson's diversity index (DI) and the number of VNTR markers used. The set of VNTR markers for 228 strains of *holarctica* subspecies was chosen as a matrix of the local database. It was determined that the maximum possible number of individual genotypes (117) is achieved already with 11 defined VNTR markers with DI=0.988. Based on the obtained data we made a choice in favour of a set of 5 VNTR markers (M3, M6, M10, M20, M24) with the maximum possible number of individual genotypes (101) with DI=0.986.

The appropriateness of this choice is supported by the results of other authors obtained previously. Four loci from our set were used for genotyping strains by 6 VNTR markers in Turkey and Bulgaria (Gürçan, 2008) [7], as well as Slovenia (Glinšek, 2021) [8]. They are also part of the MLVA9 set proposed in Obolensk [9]. The presence of the M10 locus is due to the fact that we analysed exclusively *holarctica* subspecies strains. In addition, during the study of strains isolated in Stavropol Krai in 2017, it was shown that only 5 were informative in VNTR typing at 25 loci, which completely coincided with the composition of our set (Gnusareva et al., 2018) [10]. To identify phylogenetic relationships of *F. tularensis* strains from natural foci in both Russia and Europe, MLVA typing at 5 VNTR loci was performed. VNTR analysis of 16 Russian strains, including 13 isolated at different times in Rostov region, was performed *in vitro*. Typing of strains from different European countries was carried out *in silico* using the GenBank database. The phylogenetic tree of genotypes of strains of *F. tularensis* strains is presented in Picture 3.



Picture 3. Phylogenetic tree of VNTR genotypes of 34 European and Russian strains of *F. tularensis*, constructed using the NJ algorithm.

The integrated approach based on canINDEL and VNTR typing allows to reveal phylogenetic relationships of tularemia strains circulating in different regions of the world without the need for preliminary sequencing. The phylogenetic tree reflects a clear separation of strains, primarily by subspecies and groups within subspecies, and individual characteristics of strains are represented by their VNTR genotypes.

Detailed investigation of disease outbreaks to identify the source of infection is currently difficult without a set of molecular biological methods capable of unambiguously assigning isolates to a certain subspecies and within subspecies to a certain genetic cluster, which is extremely important in the light of the requirements of modern public health and the real threat of introduction of the tularemia pathogen from other countries. Our proposed method of integrated canINDEL and VNTR typing of tularemia strains is a contribution to solving this problem.

References

1. Hopla, C. E., and A. K. Hopla. 1994. Tularemia, p. 113–126. In G. W. Beran (ed.), *Handbook of zoonoses*, 2nd ed. CRC Press, Boca Raton, FL.
2. Larson M.A., Sayood K., Bartling A.M., Meyer JR, Starr C., Baldwin J., Dempsey M.P. Differentiation of *Francisella tularensis* subspecies and subtypes. // *J Clin Microbiol.* 2020. V. 58:e01495-19. <https://doi.org/10.1128/JCM.01495-19>.

3. Sorokin VM, Vodopyanov AS, Tsimbalistova MV, Pavlovich NV Differentiation of *Francisella tularensis* subspecies by INDEL typing. // *Journal of Microbiology, Epidemiology and Immunobiology*. 2022; 99(2) 193 DOI: <https://doi.org/10.36233/0372-9311-189>
4. Keim, P., A. Johansson, and D. M. Wagner. Molecular epidemiology, evolution, and ecology of *Francisella*. // *Ann. N. Y. Acad. Sci.* 2007.1105:30–66. DOI: 10.1196/annals.1409.011
5. Vogler, A. J., Birdsell, D., Wagner, D. M., & Keim, P. An optimized, multiplexed multi-locus variable-number tandem repeat analysis system for genotyping *Francisella tularensis*. // *Letters in applied microbiology*. 2009. 48(1), 140-144.
6. O'Sullivan, M.V., Sintchenko, V. and Gilbert, G.L. Software for selecting the most informative sets of genomic loci for multi-target microbial typing. // *BMC bioinformatics*, 2013.14(1), pp.1-8. doi:10.1186/1471-2105-14-148.
7. Gürcan S, Karabay O, Karadenizli A, Karagol C, Kantardjiev T, Ivanov IN. Characteristics of the Turkish isolates of *Francisella tularensis*. // *Jpn J Infect Dis*. 2008.61(3):223–5. pmid:18503176
8. Glinšek Biškup, U., Kogoj, R., Korva, M., Knap, N., Cerar, T., Knapič, T., ... & Avšič-Županc, T. Characterization of Tularemia Cases in Slovenia with Multiple-Locus Variable-Number Tandem Repeat Analysis. // *Vector-Borne and Zoonotic Diseases*. 2021. 21(5), 351-357.
9. Timofeev V, Bakhteeva I, Titareva G, Kopylov P, Christiany D, Mokrievich A, et al. Russian isolates enlarge the known geographic diversity of *Francisella tularensis* subsp. *mediasiatica*. // *PLoS ONE*. 2017.12(9): e0183714. <https://doi.org/10.1371/journal.pone.0183714>
10. Gnusareva, O. A., Kotenev, E. S., Volynkina, A. S., Chishenyuk, T. I., & Kulichenko, A. N. Molecular-epidemiological analysis of the outbreak of tularemia in Stavropol Krai in 2017 // *Infectious Diseases: News. Opinions. Training*. 2018. 7(3 (26)), 57-61.

弗朗西斯菌属成员噬菌体的诱导
**INDUCTION OF BACTERIOPHAGES IN MEMBERS OF THE
GENUS FRANCISELLA**

Tsimbalistova Marina Viktorovna

*Candidate of Medical Sciences, Senior Research Officer
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia.*

Meloyan Misak Gevorgovich

*Research Assistant
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia.*

Pavlovich Natalia Vladimirovna

*Doctor of Medical Sciences, Chief Scientific Officer, Head of
Department
Rostov-on-Don Antiplague Scientific Research Institute” of
Rospotrebnadzor, Rostov-on-Don, Russia.*

注解。近年来,微生物噬菌体越来越多地应用于感染性疾病的诊断、治疗和预防。兔热病是一种在北半球广泛传播的自然病灶感染,包括俄罗斯联邦境内。土拉菌病病原体(土拉菌弗朗西斯菌)的生物学特性已广为人知,但土拉菌病微生物是否具有噬菌体的问题仍然悬而未决。多年来,各种研究人员多次尝试获得兔热菌噬菌体,一些作者已经成功。同时,所用方法重现性差,所得制剂不稳定。根据分类,弗朗西斯菌属包括两个种: *F. tularensis* 和 *F. philomiragia*。 *F. tularensis* 物种包括四个亚种 - *F. tularensis* subsp. *tularensis*, *medi asiatica*, *holarctica* 和 *novicida*。只有前三个主要亚种在人类病理学中具有临床重要性,而密切相关的弗朗西斯菌是免疫功能低下人群中机会性感染的病原体。本研究的目的是探讨从土拉弗朗西斯菌三个主要亚种菌株以及密切相关的弗朗西斯菌中分离噬菌体的可能性。作为这项研究的结果,我们从 *F. tularensis* subsp. 中获得了三种稳定、持久的噬菌体制剂。 *novicida* (Utah 112 和 D9876) 和 *F. philomiragia* (F9693), 不仅对弗朗西斯菌的同源和异源指示菌株具有活性,而且对大肠杆菌 ϕ 的通用指示菌株也有活性,缺乏 CRISPR-Cas 系统,这决定了微生物对噬菌体作用的抵抗。土拉弗朗西斯菌噬菌体对不同亚种土拉弗朗西斯菌指示菌株的测试表明不存在裂解作用。通过透射电镜对分离的噬菌体进行表征表明,它们均属于短足病毒科,具有多边形头部和短的生长物,根据 A.S. 的分类属于形态学组 III。 Tikhonenko, C 科, Podoviridae。

关键词：土拉弗朗西斯菌，近缘弗朗西斯菌，噬菌体。

Annotation. *In recent years, microbial bacteriophages have been increasingly used in the diagnosis, treatment and prevention of infectious diseases. Tularemia is a natural focal infection widespread in the Northern Hemisphere, including the territory of the Russian Federation. The biology of the causative agent of tularemia (Francisella tularensis) is well understood, but the question of whether the tularemia microbe has a bacteriophage remains open. Over the years, various researchers have made repeated attempts to obtain a tularemia bacteriophage and some authors have succeeded. At the same time, the methods used were poorly reproducible and the preparations obtained were unstable. According to the classification, the genus Francisella includes two species, F. tularensis and F. philomiragia. The species of F. tularensis comprise four subspecies - F. tularensis subsp. tularensis, mediasiatica, holarctica and novicida. Only the first three main subspecies are of clinical importance in human pathology, whereas closely related Francisellae are causative agents of opportunistic infections in immunocompromised people. The aim of the present study was to investigate the possibility of isolating bacteriophages from F. tularensis strains of the three major subspecies as well as closely related Francisellae. As a result of this study, we obtained three stable long-lasting preparations of bacteriophages from F. tularensis subsp. novicida (Utah 112 and D9876) and F. philomiragia (F9693), which have activity against not only homologous and heterologous indicator strains of Francisella, but also against the universal indicator strain of Escherichia coli ϕ , devoid of CRISPR-Cas system, which determines microbe resistance to bacteriophage action. Tests of francisellosis bacteriophages on indicator strains of F. tularensis of different subspecies showed the absence of lytic effect. Characterisation of isolated bacteriophages by transmission electron microscopy showed that all of them belong to the Podoviridae family, have a polygonal head and a short outgrowth and belong to morphological group III according to the classification of A.S. Tikhonenko, family C, Podoviridae.*

Keywords: *Francisella tularensis, closely related Francisella, bacteriophage.*

Introduction

In recent years, microbial bacteriophages have found increasing application in the diagnosis, treatment and prevention of infectious diseases. Tularemia is a natural focal infection widespread in the Northern Hemisphere. Endemic foci have been recorded in the Russian Federation from the western borders to Kamchatka and from the Taimyr Peninsula to the borders with the Central Asian republics. The biology of the causative agent of tularemia (*Francisella tularensis*) is well enough studied, but to date some issues have been insufficiently investigated, in particular, the presence of a bacteriophage in the tularemia microbe. Repeated at-

tempts to obtain it from *F. tularensis* have been made by different researchers for many years. Moreover, using various methodological techniques, some authors managed to obtain microbial fractions with lytic effect on indicator strains. At the same time, the methods used were poorly reproducible and the preparations studied were unstable.

According to the classification, the genus *Francisella* includes two species - *F. tularensis* and *F. philomiragia*.

F. philomiragia. The species of *F. tularensis* comprise four subspecies - *F. tularensis* subsp. *tularensis*, *mediasiatica*, *holarctica* and *novicida* [2]. However, only the first three main subspecies have clinical significance in human pathology. Whereas the closely related *Francisella* spp.

(*F. tularensis* subsp. *novicida* and subsp. *novicida*-like, as well as *F. philomiragia*) are causative agents of opportunistic infections in immunocompromised humans. As such, less attention has been paid to these microorganisms by experimentalists. There are only single reports in the literature about the presence of bacteriophages in these bacteria [3].

It seems appropriate to us to study the phenomenon of bacteriophagy in representatives of the genus *Francisella*.

The aim of the present study was to investigate the possibility of isolating bacteriophages from strains of *F. tularensis* of the three main subspecies, as well as closely related *Francisella*.

Material and methods

The virulent strains AE-261 (*F. tularensis* subsp. *tularensis*), 543 (subsp. *mediasiatica*), 503, 250, vaccine strain 15 of NIEG (subsp. *holarctica*), cultures of closely related *Francisellae* - *F. tularensis* subsp. *novicida* (Utah 112 and D9876) and *F. tularensis* subsp. *novicida* (Utah 112 and D9876) - were used in this study.

F. philomiragia (F9693), and *Escherichia coli* ϕ .

Cultures were grown on dense nutrient medium T [4] or modified Mueller-Hinton medium (Himedia, India).

Bacteriophage induction was studied using treatment of bacterial suspensions (109 CFU/ml) with chloroform at a ratio of 1:10, followed by incubation for 30 minutes at room temperature with constant shaking and centrifugation at 4000g for 20 minutes. Specific sterility of the obtained preparations (supernatants) was assessed by bacteriological method. The lytic effect of phages was determined by spot test - direct application of preparations to cups with indicator cultures. Both homologous and heterologous cultures of tularemia microbe and francisellae, as well as *Escherichia coli* ϕ were studied as indicator strains.

The structure of bacteriophage corpuscles was studied in a Jeol JEM 1011 electron microscope. Preparations were prepared from phagofiltrate obtained as a result of bacteriophage cultivation. They were pre-incubated in polyethylene

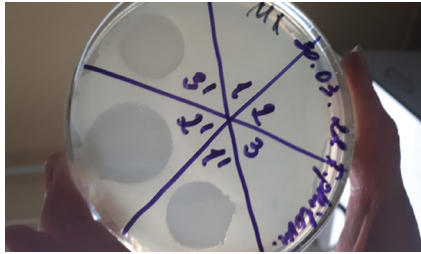
glycol for 24 hours and then precipitated by high-speed centrifugation. The resulting phage preparations were applied to the surface of an electron microscopic grid coated with formvar (0.5%) substrate. Then they were transferred to film and negatively contrasted with 2% uranyl acetate solution for 1 minute. The prepared phage samples were studied in electron microscope with 80000x magnification.

Results and Discussion

Evaluation of the preparations after extraction with chloroform showed that they did not contain viable bacteria.

Our attempts to induce active bacteriophage from different strains of the tularemia pathogen were not successful. Periodically, we observed weak lytic activity (negative stains) on homologous indicator strains, but low reproducibility of this methodological approach was recorded. In addition, their activity decreased dramatically during storage.

In contrast, the fractions isolated from the three *Francisella* strains had pronounced lytic activity against both homologous and heterologous *Francisella* strains (Pic. 1).

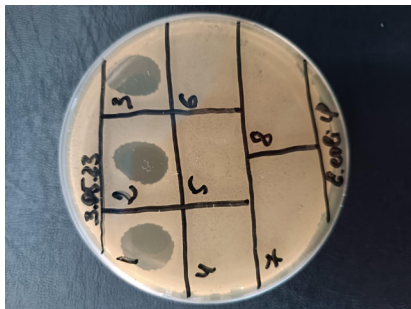


Picture 1. Lytic activity of bacteriophages isolated from: 1' - *F. tularensis* subsp. *novicida* (Utah 112), 2' - *F. tularensis* subsp. *novicida* (D9876) and 3' - *F. philomiragia* (F9693) against the indicator strain *F. philomiragia* (F9693).

Results of testing of francisellosis bacteriophages against indicator strains of *F. tularensis* of different subspecies showed the absence of lytic effect.

It is known that the presence of CRISPR-Cas system in the genome of a bacterial cell determines microbe resistance to bacteriophage action. At the same time, species devoid of CRISPR-Cas system, such as *Escherichia coli* ϕ , are universal indicator strains for the study of bacteriophage activity.

Bacteriophages isolated from *Francisella* cultures (*F. tularensis* subsp. *novicida* (Utah 112 and D9876) and *F. philomiragia* (F9693)) were found to be active against *Escherichia coli* ϕ (Picture 2).



Picture 2. Results of evaluation of lytic activity of bacteriophages from *Francisella* bacteriophages against the indicator strain *Escherichia coli* ϕ .

Characterisation of isolated preparations of phages (*F. tularensis* subsp. *novicida* (Utah 112 and D9876) and *F. philomiragia* (F9693) using transmission electron microscopy (TEM) showed that all of them belong to the Podoviridae family and have the same structure of phage corpuscles: polygonal head and short outgrowth and belong to morphological group III according to the classification of A.S. Tikhonenko, family C, *Podoviridae* [5].

It was found that the activity of francisella phages (+4°C) persists for 1 year and 8 months (observation period).

Thus, as a result of this study, stable preparations of francisella bacteriophages with lytic activity against both homologous and heterologous francisellae were obtained. Given the genetic stability of the tularemia microbe, it is possible to assume that the stable francisella bacteriophages we have discovered may be a useful tool for the genetic study of *F. tularensis*.

References

1. Olsufiev N.G. *Taxonomy, microbiology and laboratory diagnostics of tularemia pathogen.* - Moscow: Medicine, 1975. - 200 p.
2. Öhrman C, Sahl JW, Sjödin A, Uneklint I, Ballard R, Karlsson L, McDonough RF, Sundell D, Soria K, Bäckman S, Chase K, Brindefalk B, Sozhamannan S, Vallesi A, Högglund E, Ramirez-Paredes JG, Thelaus J, Colquhoun D, Myrtenäs K, Birdsell D, Johansson A, Wagner DM, Forsman M. *Reorganized Genomic Taxonomy of Francisellaceae Enables Design of Robust Environmental PCR Assays for Detection of Francisella tularensis.* *Microorganisms.* 2021 Jan 11;9(1):146. doi: 10.3390/microorganisms9010146. PMID: 33440900; PMCID: PMC7826819.

3. Köppen K., Prensa G.I., Rydzewski K.; Tlapák H., Holland G., Heuner K. First Description of a Temperate Bacteriophage (vB_FhiM_KIRK) of *Francisella hispaniensis* Strain 3523. *Viruses* 2021, 13, 327. <https://doi.org/10.3390/v13020327>

4. Pavlovich N.V., Mishankin B.N. Transparent nutrient medium for cultivation of *Francisella tularensis* // *Antibiotics and Med. biotechnol.* - 1987. - T. 32, № 2. - pp. 133-137.

5. Ackerman H.B. Bacteriophage taxonomy in 1987. *Microbiol. Sci.* 1987; 4(7): 214-8.

肺炎克雷伯菌在肺炎病原体的病原学结构中的作用日益增强
**INCREASING ROLE OF KLEBSIELLA PNEUMONIAE IN THE
ETIOLOGICAL STRUCTURE OF PNEUMONIA PATHOGENS**

Anisimova Anastasia Sergeevna

Research Assistant

*Rostov-on-Don Antiplague Scientific Research Institute” of
Rosпотrebnadzor, Rostov-on-Don, Russia.*

Tsimbalistova Marina Viktorovna

Candidate of Medical Sciences, Senior Research Officer

*Rostov-on-Don Antiplague Scientific Research Institute” of
Rosпотrebnadzor, Rostov-on-Don, Russia.*

Pavlovich Natalia Vladimirovna

*Doctor of Medical Sciences, Chief Scientific Officer, Head of
Department*

*Rostov-on-Don Antiplague Scientific Research Institute” of
Rosпотrebnadzor, Rostov-on-Don, Russia.*

注解。目前,由于对症疗法的选择有限,多重耐药(MDR)细菌的广泛传播构成了全球威胁。肺炎克雷伯菌是肠杆菌科最重要的微生物之一,它属于六种严重危及生命的病原体——ESKAPE。克雷伯氏菌通常分为“经典”菌株和“高毒力”菌株。高毒力菌株产生较厚的荚膜,这决定了其高粘液表型。我们工作的目的是对从社区获得性肺炎(CAP)冠状病毒阳性和冠状病毒阴性患者中分离出的肺炎克雷伯菌菌株的生物学特性进行比较分析:表征其抗生素耐药性、对克雷伯氏菌噬菌体和消毒剂(盐酸聚六甲基胍)的敏感性。共检查了1187份来自冠状病毒阳性(SARS-CoV-2 «+») (n=863)和冠状病毒阴性(SARS-CoV-2 «-») (n=324) CAP患者的痰样本。克雷伯氏菌属的53株细菌。(4.5%)是从临床痰样本中分离出来的。病原学结构分析显示,肺炎克雷伯菌占据主导地位(n=47)。这种病原体最常从SARS-CoV-2 «+»患者中分离出来,占4.9%,而在SARS-CoV-2 «-»患者中,这一指标为1.5%。根据营养培养基上的生长形态,鉴定出9种具有粘液稠度的超粘液培养物,其给出了阳性“串测试”,并且在Burry-Gins染色涂片中可见较厚的胶囊。大多数菌株对氨苄青霉素、阿莫西林/克拉维酸、头孢他啶、头孢噻肟和多西环素耐药性为77-100%,而碳青霉烯类和头孢哌酮/舒巴坦对70%的菌株显示出显著的抗菌活性。与经典形态型细菌相比,高粘液菌株的特征是抗性标记数量最少。只有11%的高粘液菌株对噬菌体表现出敏感性,而62%的

经典菌株对噬菌体表现出敏感性。当研究消毒剂的杀菌活性时，抗生素耐药组和敏感组之间没有发现显著差异。

关键词：肺炎克雷伯菌，高粘膜菌株，抗生素耐药性，吞噬敏感性，对消毒剂的敏感性。

Annotation. Currently, the widespread spread of multi-drug resistant (MDR) bacteria poses a global threat due to the limited choice of aetiologic therapies. One of the most important microorganisms of the *Enterobacteriaceae* family is *Klebsiella pneumoniae*, which is included in the group of six serious life-threatening pathogens - ESCAPE. *Klebsiella* are conventionally divided into «classical» and «hypervirulent» strains. Hypervirulent strains produce a thicker capsule, which determines its hypermucoid phenotype. The aim of our work was a comparative analysis of biological properties of *K. pneumoniae* strains isolated from coronapostive and coronanegative patients with community-acquired pneumonia (CAP): characterisation of their antibiotic resistance, sensitivity to *Klebsiella* bacteriophage and disinfectant (polyhexamethylguanidine hydrochloride). A total of 1187 sputum samples from coronapostive (SARS-CoV-2 «+») (n=863) and coronanegative (SARS-CoV-2 «-») (n=324) patients with CAP were examined. Fifty-three strains of bacteria of the genus *Klebsiella spp.* (4.5%) were isolated from clinical sputum samples. Analysis of the etiologic structure showed that the dominant place in the structure was occupied by *K. pneumoniae* (n=47). This pathogen was most often isolated from SARS-CoV-2 «+» patients 4.9%, while in SARS-CoV-2 «-» patients this indicator was 1.5%. According to the morphology of growth on nutrient media, 9 hypermucoid cultures of mucous consistency were identified, which gave a positive «string test» and had a thicker capsule visualised in smears with Burry-Gins staining. Most were characterised by resistance to ampicillin, amoxicillin/clavulanate, ceftazidime, cefotaxime and doxycycline 77-100%, while carbapenems and cefoperazone/sulbactam showed marked antibacterial activity against 70% of the strains. Hypermucoid strains were characterised by the lowest number of resistance markers compared to bacteria of the classical morphotype. Only 11% of hypermucoid strains showed sensitivity to the bacteriophage, whereas 62% of classical strains showed sensitivity to the bacteriophage. No significant differences were found between antibiotic resistant and sensitive groups when bactericidal activity against disinfectant was studied.

Keywords: *Klebsiella pneumoniae*, hypermucosal strains, antibiotic resistance, phagesensitivity, sensitivity to disinfectant.

Introduction

Currently, the spread of multi-drug resistant (MDR) bacteria of the *Enterobacteriaceae* family poses a global threat [1, 2]. The emergence of such strains is caused by the widespread use of antibiotics in medicine, agriculture, and animal husbandry [3, 4].

One of the representatives of this group of microorganisms most often causing the development of severe pneumonia is *Klebsiella pneumoniae*. This type of microorganisms is a representative of conditionally pathogenic human microflora, is a part of the microbiome, can colonise the mucous membranes of the urogenital system, nasopharynx and skin. However, due to the rapid formation of a high level of resistance to antibacterial drugs, *K. pneumoniae* occupies a leading position among Gram-negative agents causing healthcare-associated infections (HAIs). *K. pneumoniae* producing extended-spectrum β -lactamases and carbapenemases are included in the group of ESKAPE-resistant pathogens (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Enterobacter* spp.) [5]. According to some authors, *K. pneumoniae* is a unique microorganism, as it has the ability to acquire antibacterial drug resistance genes from microbial populations in the environment and transfer them to other clinically relevant Gram-negative bacteria [6].

K. pneumoniae strains are conventionally divided into «classical» (cKp, classical *K. pneumoniae*) and «hypervirulent» (hvKp, hypervirulent *K. pneumoniae*). Most infections caused by cKp strains manifest themselves as opportunistic, while the later hvKp strains cause severe infections not only in at-risk groups but also in healthy individuals [7]. Some hvKp strains are able to produce a thicker capsule, which allows them to be considered as hypermucoid. Such strains are considered to have increased invasiveness [8].

The aim of our work was to study the biological properties of *K. pneumoniae* strains isolated from coronapostive and coronanegative patients with community-acquired pneumonia (CAP): evaluation of their antibiotic resistance, sensitivity to commercial *Klebsiella* bacteriophage and disinfectant (polyhexamethylguanidine hydrochloride, «Biopag»).

Materials and methods

In the period from 2020 to 2022, 1187 sputum samples from coronapostive (SARS-CoV-2 «+») (n=863) and coronanegative (SARS-CoV-2 «-») (n=324) patients with CAP were investigated at the Rostov-on-Don Anti-Plague Institute of Rospotrebnadzor Federal State Health Institution.

Isolation of clinically significant CAP pathogens was performed using the bacteriological method (cultures on various nutrient media (MPA, Sabouraud, Endo, chocolate and blood agar) in accordance with the regulatory documents [9, 10].

For species identification of isolated strains, time-of-flight mass spectrometry with matrix-activated laser desorption/ionisation (MALDI-TOF MS) was used using an Autoflex speed III Bruker Daltonics (Germany) mass spectrometer and MALDI Biotyper software. The mass spectra were compared with the Bruker database version 3.1.66 (Bruker Daltonics, Germany) and assessed as high probability of species identification with a Score ≥ 2.0 [11].

Microorganisms isolated from sputum in the amount of ≥ 105 CFU/ml were considered diagnostically significant. Hypermucoid strains were identified by colony morphology (mucoïd consistency), microscopy using Burry-Giens staining (capsule thickness) and string test [12]. The result was evaluated as positive if the length of the agar culture thread stretching behind the bacteriological loop was more than 5 mm.

Antibiotic resistance of isolated cultures was assessed by disc diffusion method according to EUCASTv.12.0 criteria [13]. The sensitivity/resistance of bacteria to the following groups of antibiotics was studied: Beta-lactams (penicillins, cephalosporins), tetracyclines (doxycycline), macrolides (azithromycin), aminoglycosides (gentamicin, amikacin), carbapenems (imipenem, meropenem), fluoroquinolones (ciprofloxacin) and betalactamase-protected antibiotics (amoxicillin/clavulanate, cefoperazone/sulbactam).

Determination of the spectrum of lytic activity to bacteriophage was performed by direct method of applying a drop of bacteriophage to the test culture (108 CFU/ml) [14]. For this purpose, purified Klebsiella polyvalent bacteriophage (Microgen production) was used.

The sensitivity of antibiotic-resistant and antibiotic-sensitive strains to the disinfectant «BioPag» (polyhexamethylguanidine hydrochloride) was determined by serial dilutions in agar [15].

Statistical processing of the results was carried out using Fisher's criterion, differences were considered reliable at $p < 0.05$.

Results and Discussion.

During the study we isolated 53 strains of bacteria of the genus *Klebsiella* spp. (4.5%) from clinical sputum samples ($n=1187$). The analysis of species composition showed that the dominant place in the structure was occupied by *K. pneumoniae* ($n=47$), against *K. oxytoca* ($n=5$) and *K. ornithinolytica* ($n=1$). It is noteworthy that the pathogen *K. pneumoniae* was more often isolated from coronapositive patients - 4.9%, while in coronanegative patients this indicator was 1.5%. For further work, a collection of 22 strains of clinical isolates differing in phenotypic properties was created.

During comparative study of strains by morphology of growth on nutrient media, we identified 9 cultures of mucous consistency, which gave a positive «string test» (thread length 5-10 mm.). At microscopy of smears stained according to the Burry-Gins method, unstained capsules with bright pink bacteria inside were visualised on the dark background of the preparation. In contrast to the other cultures, these 9 strains had thicker capsules. Subsequently, we considered the mucosal cultures as hypermucoid (GM phenotype) and the other 13 as classical cultures.

An important practical aspect of the study included determining the resistance of isolated cultures to antibacterial drugs. The data are presented in Table 1.

Table 1
Results of antibiotic resistance assessment of clinical strains of K. pneumoniae.

Klebsiella species and phenotype	Number of strains tested	Number of antibiotic-resistant strains (%)											
		ampicillin	amoxicillin/clavulanate	cefotaxime	ceftazidime	gentamicin	amikacin	doxycycline	azithromycin	ciprofloxacin	cefoperazone/sulbactam	imipenem	meropenem
<i>K. pneumoniae</i> (GM phenotype)	9	100	89	67	78	56	56	89	44	56	33	22	22
<i>K. pneumoniae</i> (classical)	13	100	92	85	85	31	46	100	77	69	31	31	31

As it turned out, the strains were most resistant to ampicillin, amoxicillin/clavulanate, ceftazidime, cefotaxime and doxycycline. Special attention should be paid to the fact that some strains were resistant to antibiotics of all studied classes of drugs (panresistance). Surprising, in our opinion, is the fact that hypermucoïd strains of *K. pneumoniae* were more sensitive to some antibiotics compared to bacteria of classical morphotype. Summarising the results obtained, it was revealed that cefoperazone/sulbactam, imipenem and meropenem had pronounced antibacterial activity against the majority of the studied strains of both morphotypes ($\geq 70\%$), which allows us to consider them as drugs of choice in the treatment of Klebsiella infection. Somewhat less activity was registered for aminoglycosides (gentamicin, amikacin), the number of sensitive strains was 40-70%. Thus, the results of the study confirmed the fact that the causative agent of CAP *K. pneumoniae* has multidrug resistance. In this regard, the choice of the most adequate treatment scheme for this infectious pathology is a serious problem. A necessary, in our opinion, stage of patient management is microbiological monitoring during the whole infectious process.

Currently, intensive research is underway to search for and develop alternative methods of combating polyantibiotic-resistant pathogens. One such approach may be the use of phagotherapy [16]. The study of phagesensitivity of the strains studied to a commercial Klebsiella bacteriophage showed that only 40% of cultures were sensitive, while 60% were resistant. It should be particularly emphasised that among the hypermucoïd strains, 89% showed resistance to the bacteriophage. In contrast, 62% of strains of the classical morphotype were actively lysed by Kleb-

siella bacteriophage and only 38% showed resistance. Consequently, when prescribing bacteriophages as an additional resource for etiotropic therapy, laboratory evaluation of phagesensitivity of the pathogen is also a necessary step.

According to the literature, one of the characteristics of MDR bacteria necessary to prevent the spread of nosocomial infections is their sensitivity/resistance to disinfectants. Moreover, there is evidence of higher resistance of polyantibiotic-resistant pathogens to disinfectants [17]. In this regard, the next stage of our work included the evaluation of the sensitivity of hypermucous and classical *Klebsiellae* to polyhexamethylguanidine hydrochloride («Biopag»). At the same time, we failed to detect any significant differences in sensitivity to the disinfectant in both morphotypes. In addition, no differences were found between strains with maximum and minimum antibiotic resistance markers. The MOC for all tested cultures was 0.01%, which corresponds to the regulated concentrations for effective treatment of surfaces and associations treatment and preventive care objects.

Thus, the results of the study showed that hypermucoid and classical morphotypes of *K. pneumoniae* isolated from patients with pneumonia have their biological features, which necessitates an individual approach to etiotropic therapy regimens.

References

1. Morrill, H.J. Treatment options for carbapenem-resistant Enterobacteriaceae infections / H.J. Morrill, J.M. Pogue, K.S. Kaye et al. // *Open Forum Infect. Dis.* — 2015. Vol. 2, № 2. - ofv050. doi: 10.1093/ofid/ofv050.
2. Pitout, J.D. Carbapenemase-producing *Klebsiella pneumoniae*, a key pathogen set for global nosocomial dominance / J.D. Pitout, P. Nordmann, L. Poirel // *Antimicrob. Agents Chemother.* — 2015. Vol. 59, № 10. – P. 5873-84. doi: 10.1128/AAC.01019-15.
3. Munoz-Price, L.S. Clinical epidemiology of the global expansion of *Klebsiella pneumoniae* carbapenemases / L.S. Munoz-Price, L. Poirel, R.A. Bonomo et al. // *Lancet Infect. Dis.* — 2013. № 13. – P. 785-796. doi: 10.1016/S1473-3099(13)70190-7.
4. Canton, R. Rapid evolution and spread of carbapenemases among Enterobacteriaceae in Europe / R. Canton, M. Akova, Y. Carmeli et al. // *Clin. Microbiol. Infect.* — 2012. № 18. P. 413-431. doi: 10.1111/j.1469-0691.2012.03821.x.
5. Shrivastava, S. World health organization releases global priority list of antibiotic-resistant bacteria to guide research, discovery, and development of new antibiotics / S. Shrivastava, P. Shrivastava, J. Ramasamy // *Journal of Medical Society* – 2018. № 1. doi:10.4103/JMS.JMS 25 17.

6. Wyres, K.L. *Klebsiella pneumoniae* as a key trafficker of drug resistance genes from environmental to clinically important bacteria / K.L. Wyres, K. E Holt // *Curr. Opin. Microbiol.* — 2018. № 45. – P. 131-139. doi: 10.1016/j.mib.2018.04.004.

7. Komisarova, E.V. *Hypervirulent Klebsiella pneumoniae* - a new infectious threat / E.V.Komisarova, N.V.Volozhantsev // *Infectious Diseases* - 2019. T. 17, №3. - p. 81-89. doi: 10.20953/1729-9225-2019-3-81-89.

8. Shamina, O.V. *Klebsiella pneumoniae*: microbiological characteristics, antibiotic resistance and virulence / O.V. Shamina, E.A. Samoylova, I.E. Novikova et al. // *Russian Paediatric Journal* - 2020. T. 23, №3. - p. 191-197. doi: <http://dx.doi.org/10.18821/1560-9561-2020-23-3-191-197>.

9. MG 4.2.3115-13 *Laboratory diagnosis of out-of-hospital pneumonia: Methodological guidelines.*- M.: Federal Centre for Hygiene and Epidemiology of Rospotrebnadzor, 2014.-39 p.

10. MR 4.2.0114-16 *Laboratory diagnosis of out-of-hospital pneumonia of pneumococcal etiology: Methodological recommendations.*- M.: Federal Service for Supervision of Consumer Rights Protection and Human Welfare, 2017.-64 p.

11. MR 4.2.0089 - 14 *Use of time-of-flight mass spectrometry with matrix-activated laser desorption/ionisation (MALDI-ToF MS) for indication and identification of pathogens of I-II groups of pathogenicity: Methodological recommendations.*- M.: Federal Service for Supervision of Consumer Rights Protection and Human Welfare, 2015. -70 p.

12. Guo, Y. *Microbiological and Clinical Characteristics of Hypermucoviscous Klebsiella pneumoniae Isolates Associated with Invasive Infections in China* / Y. Guo, S. Wang, L. Zhan // *Front Cell. Infect. Microbiol.* — 2017. № 7. – P. 24. doi: 10.3389/fcimb.2017.00024.

13. *European Committee on Antimicrobial Susceptibility testing (EUCAST). Breakpoint tables for interpretation of MICs and zone diameters. Version 12.0, 2022.* https://www.eucast.org/clinical_breakpoints/

14. *Federal clinical recommendations Rational use of bacteriophages in therapeutic and anti-epidemic practice. Federal clinical recommendations.* - Moscow, 2014. - 39 p.

15. *Methods of laboratory research and testing of disinfectants to assess their efficacy and safety: Guideline P 4.2.3676-20.* M. 2020.

16. Borzilov, A.I. *Evaluation of therapeutic and prophylactic efficacy of bacteriophage Klebsiella pneumoniae vB_KpnP_KpV289 on the model of acute sepsis in mice* / A.I. Borzilov, V.P. Myakinina, O.V. Korobova et al. // *Bacteriology* - 2017. T. 2, №1. - p. 73-77. doi: 10.20953/2500-1027-2017-1-73-77.

17. Yaskovaya, O.A.. *Practical application of the results of the study of microorganism resistance to disinfectants in conducting microbiological monitoring in a surgical hospital* / O.A. Yaskovaya // *MediAl* - 2018. no. 2.

DOI 10.34660/INF.2023.27.18.114

弗朗西斯菌属细菌的囊泡形成过程研究
**STUDY OF THE VESICULATION PROCESS IN BACTERIA OF
THE GENUS FRANCISELLA**

Aronova Nadezhda Valentinovna

*Candidate of Biological Sciences, Senior Researcher
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia.*

Meloyan Misak Gevorgovich

*Research Assistant
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia.*

Pavlovich Natalia Vladimirovna

*Doctor of Medical Sciences, Chief Scientific Officer, Head of
Department
Rostov-on-Don Antiplague Scientific Research Institute of
Rospotrebnadzor, Rostov-on-Don, Russia.*

注解。我们工作的目的是找到获得兔热病微生物囊泡制剂的最佳方法。在第一阶段，我们使用透射电子显微镜研究了不同亚种的兔热病微生物产生囊泡的能力。结果发现，所有具有成熟脂多糖抗原的测试菌株均形成两种类型的囊泡 - 圆形 (OMV) 和管状 (管状, OMV/T)。下一阶段包括使用不同的方法获得一系列土拉弗拉菌囊泡制剂并评估其效率：在固体营养培养基上培养细菌，通过不同孔径的过滤器去除微生物细胞，通过高速离心浓缩样品。根据以下标准评估分离的制剂——TEM中的囊泡形态、特异性无菌性和抗原活性。事实证明，通过孔径为 $0.45 \mu\text{m}$ 的膜过滤细菌悬浮液并不能完全去除制剂中的兔热病病原体细胞，而孔径为 $0.22 \mu\text{m}$ 的过滤器可提供安全的无细胞部分。由于 LPS 的存在 (根据 RNAT 和 IC 测试)，获得的所有样品都具有特异性抗原活性。通过离心浓缩材料使我们能够获得含有圆形囊泡和管状结构的兔热病微生物囊泡制剂。进一步研究所获得的土拉弗氏菌囊泡的无细胞制剂的免疫原性和组成以确定其疫苗潜力是有希望的。

关键词：外膜囊泡，土拉弗朗西斯菌，LPS。

Annotation. *The aim of our work was to find optimal methodological approaches for obtaining preparations of vesicles of tularemia microbe. At the first stage we studied the ability of tularemia microbe of different subspecies*

*to produce vesicles using transmission electron microscopy. It was found that all tested strains possessing a full-fledged lipopolysaccharide antigen formed vesicles of two types - rounded (OMV) and tubular (tubes, OMV/T). The next stage included obtaining a series of vesicular preparations of *F. tularensis* using different methodological approaches and evaluating their efficiency: cultivation of bacteria on solid nutrient medium, removal of microbial cells through filters with different pore diameters, concentration of samples by high-speed centrifugation. The isolated preparations were evaluated according to the following criteria - vesicle morphology in TEM, specific sterility and antigenic activity. As it turned out, filtration of bacterial suspensions through membranes with a pore diameter of 0.45 μm does not completely free the preparation from cells of the tularemia pathogen, whereas filters with a pore size of 0.22 μm provide a safe cell-free fraction. All samples obtained had specific antigenic activity due to the presence of LPS (according to RNAT and IC test). Concentration of the material by centrifugation allowed us to obtain a preparation of tularemia microbe vesicles containing both rounded vesicles and tubular structures. Further study of immunogenic properties and composition of the obtained cell-free preparation of *F. tularensis* vesicles to determine its vaccine potential is promising.*

Keywords: *outer membrane vesicles, Francisella tularensis, LPS.*

Introduction

At present, the formation of outer membrane vesicles (OMV - outer membrane vesicles) in Gram-negative bacteria is a normal physiological process of their life activity. Now the phenomenon of vesiculation (blebbing) is inherent in a wide range of Gram-negative and Gram-positive bacteria [1].

It has been established that the biological role of vesicles in the macroorganism is very diverse and depends on their compositional composition, and the bacterial cell can vary the inclusion of certain components in OMV in response to changes in environmental conditions [2, 3]. Further study of the functions of outer membrane vesicles has shown their association with the patho- and immunogenesis of diseases of bacterial nature [2, 4, 5]. OMVs serve as protected vehicles for specific transmission of colonisation factors, pathogenicity and modulation of the host defence response, which contributes to the survival of the infectious agent in the macroorganism.

An important aspect of the biological function of vesicles is the fact that a diverse set of antigens of protein and lipopolysaccharide nature, which are carried by vesicles, induces adaptive immunity (formation of specific antibodies, activation of immunological memory cells, etc.). In this regard, the prospect of using vesicles to create safe cell-free vaccine preparations seems undoubted [6].

The development and introduction into practice of a vesicular vaccine against meningococci [7, 8] confirms this issue. Vesicle-based vaccines have a number

of important advantages: they are safe, contain on the outer membrane the whole complex of immunogenic determinants of the pathogen in a maximally native conformation, and have adjuvant properties. Moreover, researchers have the opportunity to create mixed preparations based on different strains of the pathogen, such vaccine preparations remain stable for a long time even at room temperature, do not require a needle method of administration and do not affect the microbiota [6, 9, 10, 11].

The role of bacterial OMVs in the pathogenesis and immunogenesis of particularly dangerous human infections and, in particular, the tularemia microbe deserves undoubted attention. The virulence and protective factors of *F. tularensis* have not been sufficiently studied to date.

Tularemia is a severe disease of humans and animals and belongs to vaccine-controlled natural focal infections. However, the currently used effective live tularemia vaccine developed empirically does not meet modern biosafety requirements for licensed vaccine preparations. Long-term studies on the development of a safe chemical vaccine based on lipopolysaccharide, the main immunodominant antigen of *F. tularensis*, immunodominant antigen of *F. tularensis*, immunodominant antigen-active proteins have not been successful. Purified preparations of LPS or LPS-protein complex presented by killed bacteria were found to lack toxicity and immunogenicity [12-15]. In this regard, one approach to solving the problem may be to elucidate the role of bacterial vesicles in the pathogenesis and immunogenesis of tularemia infection and to create a vesicular vaccine based on them in the future. There are few studies in the scientific literature on the chemical composition of francisella vesicles, their biological activity and the possibility of creating a new generation of vaccine preparations based on them, which were performed on a very limited set of strains (*F. tularensis*, *F. novicida* and *F. philomiragia*) [16-22]. It should be emphasised that a distinctive feature of tularemia microbe vesicles is the presence of two types of OMVs: spherical OMVs characteristic of many microbes and bacilliform structures characteristic only of the tularemia microbe, referred to as tubes.

The aim of work was to find optimal methodological approaches for obtaining preparations of vesicles of the tularemia pathogen.

Materials and methods

All stages of the work were carried out in accordance with the requirements of SanPiN 3.3686-21 [23].

The following strains of tularemia microbe were used in the study: *F. tularensis* subsp. *holarctica* 15 NIEG (vaccine), *F. tularensis* subsp. *holarctica* 503, *F. tularensis* subsp. *mediasiatica* 543, *F. tularensis* subsp. *holarctica* 117. The bacteria were grown on Mueller-Hinton agar with special growth supplement and polymyxin (100 units/ml).

The ultrathin structure of vesicles was studied using a Jeol JEM 1011 transmissive electron digital microscope. All manipulations were performed according to MU 1.3.3103-13 [24]. Decontamination of preparations and suspensions of microorganisms for electron microscopy was carried out with the addition of glutaric aldehyde to a final concentration of 2.5% with an exposure time of 2 hours with subsequent control of their specific sterility by bacteriological method. The studied samples were stained by negative contrast staining method, for which the disinfected preparations were applied on grids with formvar film backing (0.5%) and incubated for 2 minutes with 2% uranyl acetate solution. The prepared samples were studied in an electron microscope with a magnification of 40-200 thousand times.

Concentrated preparations of vesicles were obtained according to the method described by Gamazo C. et al (1989) [25]. As a starting material for isolation of OMV and OMV/T

F. tularensis bacterial suspension of daily agar culture at a concentration of 1010 m.cells/ml was used. The suspension was centrifuged for 15 min at 10000g to precipitate the cells. In order to remove the remaining bacterial cells, the supernatants were filtered through membranes (polyethylsulfone, PES) with pore diameters of 0.45µm or 0.22µm.

High-speed centrifugation (90 min, 44000g) was used to concentrate vesicles in the cell-free filtrates. The precipitates were resuspended in 0.5 ml of physiological solution.

The specific sterility of the obtained samples was controlled by bacteriological method.

The presence and morphology of vesicles were assessed by viewing smears in transmission electron microscopy (TEM).

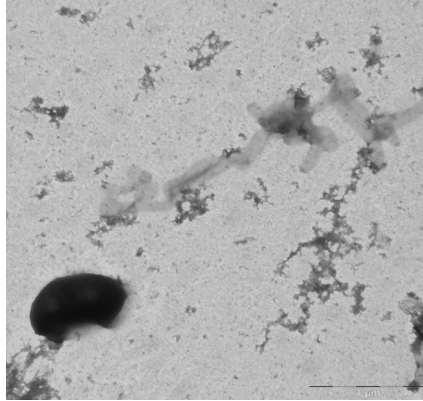
Specific antigenic activity of cell-free vesicular preparations was determined in the antibody neutralisation reaction with erythrocyte antigenic tularemia diagnosticum ("RNGA-Ag-StavNIPCHI", produced by ENHC Stavropol Anti-Plague Institute of Rosportebnadzor, Stavropol, Russia) and by immunochromatographic tests (RNGA-Ag-StavNIPCHI, Stavropol, Russia). Stavropol) and using immunochromatographic tests (*F. tularensis* IC test-system) for detection of the antigen of the tularemia pathogen (produced by Federal State Institution of Science State Research Center for Applied Microbiology and Biotechnology, Obolensk).

Results and discussion

To study vesiculation processes in bacteria, the most reliable and informative method is transmission electron microscopy, which allows visualising these microbial formations, their morphology and quantity. Therefore, at the first stage, a comparative analysis of OMV formation in virulent strains of tularemia microbe of different subspecies was carried out using TEM. Two virulent strains of *F. tula-*

rensis and vaccine strain 15/10 of the Holarctic subspecies and one of the Central Asian subspecies were included in the work.

It was found that all the strains studied, possessing a full-fledged lipopolysaccharide antigen, produced vesicles of two types; rounded (OMV) and tubular (tubes, OMV/T), characteristic only for the tularemia microbe (Pic. 1).



Picture 1. TEM of bacterial culture of *F. tularensis* subsp *holarctica* 503. Bacterial cells (intensely stained) and vesicles of rounded and tubular shape (weakly stained) are presented (magnification 1:40000)

Vesicle size did not differ between strains and ranged from 0.05 to 0.2 μm for rounded vesicles. The tubular structures characteristic of *Francisella* were characteristically large, ranging from 0.3 to 0.5 μm in length and 0.06 to 0.1 μm across. The vaccine strain was slightly characterised by reduced production of OMV/T compared to virulent bacteria.

The virulent strain with the most active production of vesicles of both types of *F. tularensis* subsp. *mediasiatica* 543 was selected for further work on obtaining cell-free concentrated preparations of OMV and OMV/T.

In order to find the most rational methodological approaches for obtaining preparations of *F. tularensis* vesicles, the influence of the following parameters on the quality of samples was evaluated: bacterial growth on solid or liquid nutrient medium, efficiency of filtration of microbial cells through membranes with different pore diameters, concentration of samples by high-speed centrifugation. After filtration and at the stage of finished preparations, their biological safety was checked by control seeding on special nutrient media.

According to the results of the bacteriological method, specific sterility of the samples was ensured only by filtration through a membrane filter with a pore diameter of 0.22 μm . As it turned out, the samples initially containing 1010 m.cells/

ml, after cell sedimentation by centrifugation and subsequent filtration through 0.45 µm pores, contained live tularemia bacteria in the concentration of $n \times 10^2$ CFU/ml, and the preparations concentrated by high-speed centrifugation - $n \times 10^3$ CFU/ml. Consequently, we were unable to obtain safe cell-free preparations using this methodology.

The presence and morphology of OMV in the samples were monitored by TEM at all stages of preparation. We found that in preparations (0.45 µm), after concentration by high-speed centrifugation (90 min, 44000g), rounded and tubular vesicles were present in clearly visualisable quantities.

In contrast, preparations (0.22 µm) did not contain live microbial cells but were depleted of tubular elements. It is possible that this phenomenon is due to the larger size of OMV/T, which prevents them from effectively traversing a membrane with small pores.

The next stage of the present study was to examine the isolated vesicular preparations for their specific antigenic activity. As it turned out, all obtained samples (0.45 µm and 0.22 µm) showed pronounced antigenic properties in serological reactions designed to detect specific immunodominant tularemia antigen - LPS. These results were confirmed by immunochromatography and immunoblotting, which revealed the presence of LPS and 63-65 kDa antigen active proteins.

Thus, it has been shown that the vesiculation process is a natural function of the tularemia microbe. The elucidation of the biological feasibility of this phenomenon is promising in our opinion. Cell-free biologically safe preparations of tularemia microbe vesicles with specific antigenic activity were obtained.

References

1. Beveridge, T.J. Structures of gram-negative cell walls and their derived membrane vesicles / T.J. Beveridge // *J. Bacteriol.* – 1999. – № 181. – P.4725–4733. doi: 10.1128/JB.181.16.4725-4733.1999.
2. Ellis, T.N. Virulence and immunomodulatory roles of bacterial outer membrane vesicles / T.N. Ellis, M.J. Kuehn // *Microbiol. Mol. Biol. Rev.* – 2010. - Vol. 74, № 1. – P.81-94.
3. Lee, E.Y. Proteomics in Gram-negative bacterial outer membrane vesicles / E.Y. Lee, D.S. Choi, K.P. Kim, Y.S. Gho // *Mass Spectrom.* - 2008. - Vol. 27. - P. 535-555.
4. Kuehn, M.J. Bacterial outer membrane vesicles and the host-pathogen interaction / M.J. Kuehn, N.C. Kesty // *Genes. Dev.* - 2005. - Vol. 19, № 22. - P. 2645-2655.

5. Yoon, H. *Bacterial outer membrane vesicles as a delivery system for virulence regulation* / H. Yoon // *J. Microbiol. Biotechnol.* – 2016. – Vol. 26. – № 8. – P. 1343-1347. doi: 10.4014/jmb.1604.04080
6. Wang, S. *Outer membrane vesicles for vaccination and targeted drug delivery* / S. Wang, J. Gao, Z. Wang et al. // *Interdiscip. Rev. Nanomed. Nanobiotechnol.* – 2019. – Vol. 11, № 2. – e1523.
7. Holst, J. *Properties and clinical performance of vaccines containing outer membrane vesicles from Neisseria meningitidis* / J. Holst, D. Martin, R. Arnold et al. // *Vaccine* - 2009. - Vol. 27, № 2. - B3-B12.
8. Petousis-Harris, H. *Effectiveness of a group B outer membrane vesicle meningococcal vaccine against gonorrhoea in New Zealand: A retrospective case-control study* / H. Petousis-Harris, J. Paynter, J. Morgan et al. // *Lancet* - 2017. - Vol. 390, № 10102. - P. 1603-1610
9. van der Pol, L., Stork M., van der Ley P. *Outer membrane vesicles as platform vaccine technology* / L. van der Pol, M. Stork, P. van der Ley // *Biotechnol. J.* – 2015. – Vol.10, № 11. – P. 1689–1706.
10. Macia, L. *Host- and microbiota-derived extracellular vesicles immune function and disease development* / L. Macia, R. Nanan, E. Hosseini-Beheshti, G.E. Grau // *Int. J. Mol. Sci.* – 2020. – Vol. 21, № 1. – P. 107.
11. Zhu, Z. *Bacterial outer membrane vesicles as a versatile tool in vaccine research and the fight against antimicrobial resistance.* / Z. Zhu, F. Antenucci. R.R. Villumsen, A.M. Bojesen // *mBio.* – 2021. – Vol. 12. – № 4. – e0170721. doi: 10.1128/mBio.01707-21
12. Sandström, G. *Immunogenesis and toxicity of lipopolysaccharide from Francisella tularensis LVS* / G. Sandström, A. Sjöstedt, T. Johansson et al. // *FEMS Microbiol. Immunol.* – 1992. - Vol. 105. - P. 201-210.
13. Ellis, J. *Tularemia* / J. Ellis, C.F. Oyston, M. Green, R.W. Titball // *Clin. Microbiol. Rev.* – 2002. - Vol. 15, № 4. - P. 631-646.
14. Оноприенко, Н.Н. *Роль липополисахарида в токсичности бактерий р. Francisella* / Н.Н. Оноприенко, Н.В. Павлович // *Мол. генетика, микробиол. и вирусол.* - 2003. - № 3. - С. 23-28.
15. Pierson, T. *Proteomic characterization and functional analysis of outer membrane vesicles of Francisella novicida suggests possible role in virulence and use as a vaccine* / T. Pierson, D. Matrakas, Y.U. Taylor et al. // *J. Proteome Res.* – 2011. - Vol. 10, № 3. - P. 954-967. doi: 10.1021/pr1009756
16. McCaig, W.D. *Production of outer membrane vesicles and outer membrane tubes by Francisella novicida* / W.D. McCaig, A. Koller, D.G. Thanassi // *J. Bacteriol.* – 2013. - Vol. 195, № 6. – P. 1120-1132. doi: 10.1128/JB.02007-12

17. Rowe, H.M. *From the outside-in: The Francisella tularensis envelope and virulence* / H.M. Rowe, J.F. Huntley // *Front. Cell. Infect. Microbiol.* – 2015. - Vol. 5, № 94. – P. 1-20.

18. Chen, F. *Outer membrane vesicle-associated lipase FtlA enhances cellular invasion and virulence in Francisella tularensis LVS* / F. Chen, G. Cui, S. Wang et al. // *Emerg. Microbes. Infect.* - 2017. - Vol. 6, № 7. - e66. doi: 10.1038/em.2017.53.

19. Champion, A.E. *Further characterization of the capsule-like complex (CLC) produced by Francisella tularensis subspecies tularensis: protective efficacy and similarity to outer membrane vesicles* / A.E. Champion, A.B. Bandara, N. Mohapatra et al. // *Front. Cell. Infect. Microbiol.* - 2018. - Vol. 8, - № 182. - P. 1 - 21. doi: 10.3389/fcimb.2018.00182

20. Sampath, V. *Amino acid deprivation and central carbon metabolism regulate the production of outer membrane vesicles and tubes by Francisella* / V. Sampath, W.D. McCaig, D.G. Thanassi // *Mol. Microbiol.* - 2018. - Vol. 107, № 4. - P. 523-541. doi: 10.1111/mmi.13897

21. Klimentova, J. *Francisella tularensis subsp. holarctica releases differentially loaded outer membrane vesicles under various stress conditions* / J. Klimentova, I. Pavkova, L. Horcickova et al // *Front. Microbiol.* - 2019. - Vol. 10. - Article 2304. doi: 10.3389/fmicb.2019.02304

22. Klimentova, J. *Francisella tularensis subsp. holarctica releases differentially loaded outer membrane vesicles under various stress conditions* / J. Klimentova, I. Pavkova, L. Horcickova et al // *Front Microbiol.* – 2019. – № 10. – P. 2304. doi: 10.3389/fmicb.2019.02304.

23. SanPiN 3.3686-21 «Sanitary and Epidemiological Requirements for the Prevention of Infectious Diseases». Approved by the decree of the Chief State Sanitary Doctor of the Russian Federation from 28.01.2021 N 4. - M. - 2021.- 1092 p.

24. MU 1.3.3103-13 *Organization of laboratories using electron and atomic force microscopy methods in the study of cultures of microorganisms of I-IV groups of pathogenicity: Methodological guidelines.*-M.: Federal Centre of Hygiene and Epidemiology of Rospotrebnadzor, 2013.-20 pp.

25. Gamazo C, Winter AJ, Moriyón I, Riezu-Boj JI, Blasco JM, Díaz R. *Comparative analyses of proteins extracted by hot saline or released spontaneously into outer membrane blebs from field strains of Brucella ovis and Brucella melitensis* / C. Gamazo, A.J. Winter, I. Moriyón et al // *Infect Immun.* – 1989. – Vol. 57. – № 5. – P. 1419-26. doi: 10.1128/iai.57.5.1419-1426.1989.

DOI 10.34660/INF.2023.56.21.115

人为影响对积雪理化指标的影响研究

**STUDY ON THE IMPACT OF ANTHROPOGENIC EFFECTS ON
THE PHYSICAL-CHEMICAL INDICATORS OF SNOW COVER**

Gordeeva Maria Eduardovna

*Candidate of Biological Sciences, Associate Professor
Kazan State Power Engineering University*

Sirazieva Diana Evgenevna

*Student
Kazan State Power Engineering University*

Abramova Sofya Michailovna

*Student
Kazan State Power Engineering University*

Knowledge of the patterns of the distribution of snow cover, its physicochemical characteristics is important from hydrological, agricultural, climatic and other points of view. Information on snow cover helps to carefully manage of water and soil resources and protect them from harmful anthropogenic impact [1]. The literary review revealed a particular interest in this theme. The study of the physicochemical composition of the snow cover contributes to the solution of a number of regional environmental tasks, because the snow cover is one of the components in the atmosphere system - snow cover - natural waters - hydrobiont - human.

A literary review shows that the most popular research today is research of snow acidity – it is an important integral indicator of atmospheric pollution. For example, a study of the snow acidity in the largest metropolis of the Russian Federation showed a significant range of values from 4,8 to 7,2 [2]. At the same time, it is considered that clean snow, like clean rainwater, has the pH of 5,6. It is also necessary to take into account the sampling places, because near industrial facilities the pH values of the snow cover can reach 10. Study in Poland showed that near a steel plant the pH values varied from 6,31 to 10,18, while the value of the coefficient of variation was quite low - 17% [3].

The other most popular physicochemical indicator when working with snow cover is the total mineralization. Total mineralization is the sum of the concentration of all determined ions. It was revealed that the cleaner the snow sample, the

lower the value of total mineralization. Even in cities with a strong anthropogenic impact, the range of changes in the total mineralization of the snow cover varies from 4,2 to 78 mg/l [2].

In addition to acidity and total mineralization, the most impactful for analyzing and solving of regional problems is to determine the chemical composition of the snow cover, which allows us to draw conclusions about the main sources of pollution and take appropriate decisions.

We propose to introduce an additional indicator for analysis - redox potential (ORP) [4], which was tested on the analysis of water quality and proved its effectiveness.

The measurement of the described indicators in our study was carried out using the HANNA HI98196/10 portable multi-parameter meter. 28 snow samples from 7 districts of the city of Kazan were collected and researched. The results of measurements of pH, total mineralization (Tds) and ORP (Eh) are shown in Figure 1.

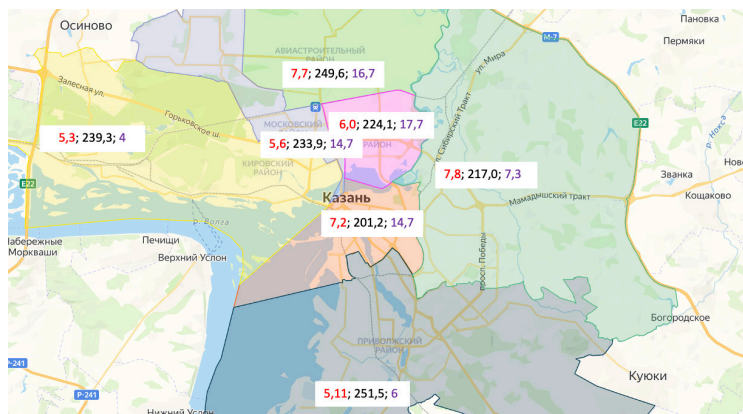


Figure 1. pH variations (red values), ORP variations (black values) and total mineralization variations (violet values) of the snow cover in the park zones of Kazan

As can be seen from the data presented in Figure 1, when remote from the city center, the pH values are approaches to the values of “clean snow”, which indicates a favorable ecological situation (low pollution of the city’s atmosphere [5]). At the same time, it should be noted that in the park zones of residential areas located in the vicinity of the city center - Moscow and Novo-Savinovsky districts - pH values are closed to the indicators of “clean snow” (5,6 and 6,0, respectively). In two districts of the city, there is an alkalization of snow cover up to 7,8 units (Sovetsky district – 7,8 and Aviastroitely district – 7,7). The reason for the

alkalinization of the snow cover in the Aviastroitelny District may be due to the presence of a large city-forming chemical plant in this area, in the Soviet District there is a central city road.

Therefore, an additional experiment was conducted to change the pH values of snow at the distance from the road. It was proved that changes in the physical and chemical parameters of snow are already observed with minimal distance from the roadway (Fig. 2).

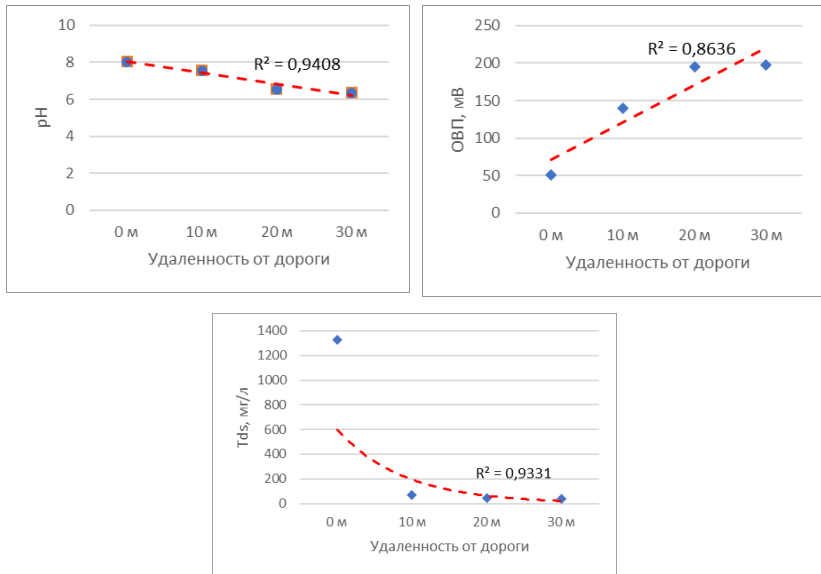


Figure 2. Changes in physical and chemical indicators of snow at distance from the roadway

The data presented in Figure 2 shows that the pH values of snow on the roadside is $8,04 \pm 0,2$. At the same time, with a distance of 30 meters from the road, the pH value may decrease by 1,3 times.

Redox potential values decrease as pH values increase (Fig. 1, 2). In general, ORP is a more sensitive indicator compared to pH, but needs additional research. For example, with a pH value of 7,7 in the Aviastroitelny District the ORP value was 249,6 mV – it is higher than the ORP value of the Vakhitovsky district with a lower pH. Despite this, in the conducted additional experiment, there is a direct dependence of distance from the road and an increase in ORP values (Fig. 2). The ORP value near the road averaged $50,2 \pm 5,6$ mV and at a distance of 30 meters - $197,2 \pm 13,1$ mV (3,9 times higher).

The most representative of the studies was the indicator of total mineralization for study the “purity” of the snow cover. In park areas near the city center the values of total mineralization were varied from $14,7\pm 2,1$ mg/l to $17,7\pm 2,3$ mg/l, with the distance to the periphery of the city the values were decreased to less than 10 mg/l. The exception is the Aviastroitely District in which located the chemical plant as it was mentioned before. Despite this, it should be noted that according to literature atmospheric precipitation is weakly mineralized and the value of total mineralization can be varied from 10 to 30 mg/L. At the same time, if we compare the values of total mineralization of the main rivers flowing near the city of Kazan, they are on average 327 ± 66 mg/l. Thus, in the spring period of time, when snow melts, the total mineralization of the reservoir will decrease [6] (subject to “clean” snow cover), and in the summer period of time, when evaporation, will increase. The additional experiment shows the sensitivity of this parameter to chemical contamination (Fig. 2). The value of total mineralization at the roadside was $1328\pm 37,5$ mg/l, and at a distance of 30 meters - $36\pm 4,7$ mg/l, i.e. the value decreased by 39.9 times.

In general, the study of the state of the snow cover in the park zones of the city of Kazan indicates low atmospheric pollution, the values of pH and total mineralization are close to the values of uncontaminated atmospheric precipitation. The alkaline environment of the snow cover and the increase the total mineralization is observed in the Aviastroitely, Vakhitovsky and Sovetsky Districts, which is probably due to the presence of a city-forming chemical plant and wide city highways. It is necessary to carry out additional studies of redox potential to assess the possibility of its application from the point of view of the quality of the snow cover, as well as the component composition of the chemical elements contained in the snow cover for a more thorough study of the justifications for air and snow pollution.

References

1. *Batrshina S.F. Dynamics of snow cover in the territory of Tatarstan in the second half of the XX century: autoref.... dis. cand. geogr. sciences: 25.00.30. Kazan, 2005 – 21 p.*
2. *Eremina I.D., Grigoriev A.V. Acidity and chemical composition of snow cover in Moscow and Moscow region for the period of 1999-2006 // Bulletin of Moscow University. – 2010. - №3. - pp.55-60*
3. *Larżyna K., Kozłowski R., Szwed M. Chemical properties of snow cover as impact indicator for local air pollution sources // Infrastructure and ecology of rural areas. – Polish Academy of Science, Cracow Branch, No IV/2/2017. – p.1591-1607*

4. Kalayda M.L., Gordeeva M.E. *Abiotic environmental factors in the classification of waters of energy facilities for aquaculture tasks // Water bioresources and habitat.* – 2021. - V.4. - pp. 31-39

5. Adamiec E., Wieszala R., Strzebonska M, Jarosz-Krzeminska E. *An attempt to identify traffic related elements in snow // Geology, Geophysics & Environment,* 2013, V.39, No 4. – pp. 317-329

6. *Features of formation of chemical composition of water in cooling pond in conditions of anthropogenic impact // Hydrometeorology and Ecology.* - 2015. - №1. - pp. 150-156

基于生产环境质量与环境管理方案实施的安全强化实践（以办公机构为例）
**SAFETY ENHANCEMENT PRACTICES ON THE BASE OF
IMPLEMENTATION OF QUALITY AND ENVIRONMENTAL
MANAGEMENT PROGRAMS FOR THE PRODUCTION
ENVIRONMENT (ON THE EXAMPLE OF OFFICE
ORGANIZATIONS)**

Agoshkov Alexander Ivanovich

Doctor of Technical Sciences

Far Eastern Federal University, Vladivostok, Russia

Sushkova Anna Vladimirovna

Candidate of Technical Sciences

Educational complex "South-West", Moscow, Russia

Kurochkin Pavel Aleksandrovich

JSC «NIPIGAS», Moscow, Russia

注解。 职业安全领域工作的目标仍然是降低职业事故和职业病造成的死亡和伤害水平，包括通过职业安全领域向职业风险管理体系的过渡（包括告知员工相关风险），建立一个识别、评估和控制此类风险的系统），以及通过经济激励雇主改善工作条件。 为了实现这一目标并解决安全管理领域的一系列相互关联的任务，企业和组织在其日常活动中制定并实施集成的健康、安全和环境管理体系。

影响人类生命、健康和工作能力的工作条件取决于建筑物和构筑物的状况、工作场所的设计和组织的、用于履行工作职责的设备、工具和材料。 劳动强度是生产环境和劳动过程对员工状况产生负面影响的主要因素之一。 劳动紧张反映了与所从事的工作直接相关的中枢神经系统、感觉器官、情感和智力领域的负荷。

文章作者在制定和实施环境管理战略和有针对性的措施方案的基础上，分析了制定和实施确保安全工作条件、减少一般和微小伤害、减少一般发病人数的措施方案的经验。 改善工作条件。

关键词：职业安全、劳动保护、环境保护、管理体系、管理。

Annotation. *The aim of work in the field of occupational safety remains to reduce the level of death and injury from occupational accidents and occupational diseases, including through the transition in the field of occupational safety to the system of occupational risk management (including informing employees about relevant risks, creating a system for identifying, assessing and controlling such risks), as well as through economic motivation for the employer to improve*

working conditions. In order to achieve this goal and solve a set of interrelated tasks in the field of safety management, enterprises and organisations develop and implement integrated health, safety and environmental management systems in their daily activities.

Working conditions affecting human life, health and working capacity depend on the condition of buildings and structures, design and organisation of workplaces, equipment, tools and materials used to perform work duties. Labour intensity is one of the main factors of the production environment and labour process that have a negative impact on the condition of the employee. Labour tension reflects the load on the central nervous system, sensory organs, emotional and intellectual spheres directly related to the work performed.

The authors of the article analyse the experience of development and implementation of programmes of measures to ensure safe working conditions, reduce general and micro-injuries, reduce the number of general morbidity based on the development and implementation of environmental management strategy and targeted programmes of measures to improve working conditions.

Keywords: *occupational safety, labour protection, environmental protection, management system, management.*

Introduction

The Labour Code of the Russian Federation (No. 197-FL, Articles 229.2 and 230) [1] in the process of investigation of accidents with employees provides an opportunity to record cases of personal negligence of the victim. The facts of personal negligence are associated by domestic and foreign researchers with the influence of the human factor on the process and result of labour of employees of enterprises and organisations of various forms of ownership and different industry affiliation:

- in [2] it is noted that 25-30% of incidents at mining enterprises (included cases of injuries, accidents and incidents) occur due to personal negligence of the employee;

- domestic researchers [3] in the process of studying the causes of registered fatal accidents during work at mining enterprises in 2022 found that the main cause of such accidents is violation of safe work performance requirements and personal negligence of victims;

- analysis of the data on occupational injuries in the Gazprom Group [4] shows that the main cause of such incidents is the negative impact of the human factor, expressed in the failure to take personal safety measures by the employee;

- a study of occupational injury data of Moscow Metro workers [5] found that in the vast majority of cases the human factor is the main cause of an accident involving an employee;

- studies of occupational injuries of firefighters [6-8] also establish the dominance of human factor influence in the statistics of occupational injuries of workers.

A study of injuries (including fatal injuries) of employees of the Russian Ministry of Emergency Situations [9] shows that 50% of the registered cases are caused by the human factor (personal carelessness of employees). The authors also found that the complexity and psychoclonic tension of work are factors that create favourable conditions for negative manifestations of the human factor.

Also, domestic researchers [10,11] showed that the human factor (personal carelessness) is the main cause of occupational injuries of firefighters and accounts for about 40% of all accidents in the performance of their duties.

Thus, increased complexity, severity and tension of the labour process are conditions that cause the negative impact of the human factor on the process and result of labour activity.

Selection of directions for improving the effectiveness of measures in the field of labour protection, quality and environmental safety. The development of practical approaches and methods to improve the effectiveness of measures in the field of labour protection, quality and environmental safety is carried out by many large organisations. JSC “NIPIGAS” together with the social partner SBPEI “Educational complex “South-West” (SBPEI “EC “South-West”) attracted the students performing research works at the Minor Academy of Sciences Technologies and Business (MASTB) for this work. Teams of students and mentors - experienced experts in the field of occupational health and safety and environmental protection JSC NIPIGAS looked at ways to improve the effectiveness of interventions for “office” workers. The recommendations they developed can be adapted and applied to the activities of public institutions, educational institutions and office centres. The main suggestions included:

- development of the main directions (policies) in the field of occupational safety and environmental protection;
- development of a strategy for managing environmental quality improvement issues;
- development of targeted environmental programmes “Green Office” to improve environmental quality for office workers.

The organisation’s strategy in the field of environmental safety and quality. The environmental strategy of the enterprise is a document describing general approaches and directions of activity not only in the field of environmental protection (waste management, emission management, etc.), but also touching upon the issues of quality and safety of the environment surrounding the employees.

The purpose of the Organisation’s environmental strategy is to create a structure of the Enterprise with environmentally conscious management in accord-

ance with the goals of sustainable development and development goals within the framework of the National Project “Ecology”.

Scope of the environmental strategy: applies to all subdivisions/enterprises or organisations, as well as all counterparties of the Enterprise that perform work and/or provide services on the territory of the Enterprise or on the territory of its subdivisions.

The main recommendations for actions and activities are summarised in Table 1.

Table 1

Main activities and measures of the environmental strategy of the enterprise

Main directions of the strategy	Reference to the SD Goals and National Project	Environmental activities	What do we get / Target aspect
Engineering and line operations			
Coordination of environmental engineering and line activities in the area of Environmental Protection	SDG 17 - Partnerships for Sustainable Development	1. Internal reporting forums or sessions of ecologists to share experience or best practices (1 or 2 times a year) with the invitation of Customers/Partners and Contracting Organisations. 2. Creation of a unified information base: projects and project documentation on EP, LNA, legislative registers in the field of EP, methodological documentation on EPC project management. 3. Development and issue of EP handbook on best practices, innovations and achievements in the field of EP JSC «NIPIGAS» 4. Development of regulations (Instruction) on DSW contract management in the field of environmental protection.	1,2. A unified information field for all environmentalists and for the «EP» direction of JSC NIPIGAS, including the implemented COSH for the «Ecology» block 3. electronic annual reference book on «Environmental Safety» of JSC NIPIGAS 4. Developed structure for DSW contract management in the EP part, including environmental risks of projects.
Procurement of materials and logistics			
Assessment of environmental parameters in the selection,	SDG 12 - Responsible consumption and production.	1. Give preference to local companies when selecting contractors-suppliers of materials. Make changes/	1. Reduced carbon and environmental footprint, reduced waste generation in

Main directions of the strategy	Reference to the SD Goals and National Project	Environmental activities	What do we get / Target aspect
procurement and supply of materials.	SDG 13 - Combating climate change	additions to documented processes for selecting contractors. 2. Implement a process to vet manufacturers and suppliers of hazardous materials in accordance with I-114.001-01 «Instructions for Handling Hazardous Materials».	material supply. 2. Reducing the risk and potential harmful effects of hazardous chemical materials on the environment and on humans
Construction			
Introduction of corporate programmes «Clean Earth», «Clean Air», «Clean Water and Water without Losses»	SDG 6 - Clean Water and Sanitation SDG 7 - Affordable and Clean Energy SDG 12 - Responsible Consumption and Production	1. Conduct outreach and implementation of Programme implementation activities. 2. communicating the status of programme implementation to all staff. 3. Conducting performance reviews of programme implementation processes. 4. Coordination of corporate programme templates at the level of the Enterprise Management.	Environmental friendliness of construction and operation of project offices
Functioning of offices			
Implementation of the corporate Green Office programme	SDG 6 SDG 8 - Decent Work and Economic Growth SDG 11 - Sustainable Cities and Human Settlements SDG 12	1. Rollout of the programme to all Enterprise offices with adaptation on technical and legal aspects of IC/OS/BC. 2. Monitoring the status of programme implementation. 3. Conducting an analysis of the effectiveness of the programme implementation processes.	Environmental friendliness of the functioning of the Offices of the Detached Subdivisions

Main directions of the strategy	Reference to the SD Goals and National Project	Environmental activities	What do we get / Target aspect
All activities (general corporate matters)			
Development of Environmental Responsibility of Management and Personnel	SDG 8 SDG 16 - Peace, Justice and Effective Institutions SDG 17 - Partnership for Sustainable Development	1. Development and implementation of the Environmental Policy. Publication of the document in the relevant subsection on the Company’s website. 2. Setting annual environmental goals of the Enterprise and KPIs (key performance indicators) in the field of sustainable development for the Managers. 3. Organising an Environmental Committee or Council to discuss and review the implementation of annual environmental goals and KPIs. 3 Organise an Environmental Committee or Council to discuss and review the implementation of the annual environmental objectives and KPIs and to develop further strategy of the Company. 4. Define requirements for competence of employees responsible for making management decisions in the field of EP. Organise and conduct necessary EP and SD training for responsible personnel.	1, 2. Creation of the fundamental document on ecology and setting of goals will allow to show the Management’s commitment to the environmental path of the Enterprise’s development. 3. Organisation of the Committee will allow to develop more effective measures on the identified gaps in the EP management system and achieve the set objectives more effectively. 4. The Management and responsible persons for EP have all necessary competences in environmental safety and SD.
Disclosure of information on the Company’s key environmental indicators, programmes, regulatory documents	SDG 16 - Peace, justice and effective institutions SDG 17 - Partnership for Sustainable Development	1. Systematisation of environmental indicators broken down to provide information across the Company and by existing initiatives and programmes.	1,2,3. The company’s openness in environmental and SD issues.

Main directions of the strategy	Reference to the SD Goals and National Project	Environmental activities	What do we get / Target aspect
and public EP commitments.		2. Publication of information on the Company's environmental performance on internal and external portals and information resources 3. Create (finalise) a section/page on external and internal portals dedicated to the Company's EP.	
Efficient waste management and 100% waste segregation in construction projects and IC/BC/OS office operations	SDG 12 - Responsible Consumption and Production	1 Organise an assessment of contractors responsible for waste management. 2. Implement measures and technologies aimed at reducing waste generation and increasing its reuse 3. organise the process of returning products and packaging materials to the manufacturer for recycling or reuse (to be worked out together with the WTO/WSS). 4 Organise the required number of waste accumulation sites.	1,2,3,4. Reduction of waste generation and increase of recyclable waste volume
Biodiversity conservation	SDG 15 - Conservation of terrestrial ecosystems	1. Creation of an ecological trail in the area of the company's presence. 2. Participation in the All-Russian project «Garden of Memory».	1,2. Improving the company's image in the media and among the public as an environmentally oriented organisation. Contribution to the preservation of natural resources and raising people's awareness of the ecology of their native land

Main directions of the strategy	Reference to the SD Goals and National Project	Environmental activities	What do we get / Target aspect
Climate programme	SDG 13 - Combating climate change	<ol style="list-style-type: none"> 1. Development and implementation of a programme for climate impact management, including updating the methodology for inventory of emission sources and calculation of greenhouse gas emissions (hereinafter - GHGs) and development of a methodology for inventory, accounting of ozone-depleting substances and control of SO. 2. Inventory of sources of greenhouse gas emissions (hereinafter - GHGs) by enterprise (mobile transport, stationary fuel equipment, electricity/heat energy from suppliers). 3. Conduct an inventory of the presence of ozone-depleting substances in the enterprise's OS. 4. Annual climate programme report describing climate risks and mitigation measures. 	1,2,3,4 A climate change strategy describing climate risks and mitigation/control measures is developed and applied

Note: SD - sustainable development.

Targeted corporate programmes to improve the quality and safety of the office environment. It is advisable to develop targeted corporate programmes to create a quality, safe and environmentally friendly office environment. Table 4 shows the recommendations developed by the students of SBPEI “South-West” and experts of JSC “NIPIGAS”.

Table 4

Health improvement and environmental friendliness of the environment in which office workers work: programme of recommended measures

Recommended measures	Documents, records
Air	
Ventilation system: - Installation of a supply or exhaust type system; - supply air filters are available. Replace when contaminated and/or according to passport data.	Ventilation system passport Filter replacement log B
Smoking areas: - Location outside the office areas outside the building at least 15 m away from the building, main pavements and passageways; - shelter from wind and rain; - installation of appropriate signs in the office and smoking area about the location and prohibition of smoking in unauthorised areas.	Appropriate smoking areas are available
Control of the content of concentrations of harmful substances in the air of office premises: Carrying out measurements of the concentration of harmful substances in the air (choose one of the options): 1. By a third-party accredited laboratory. 2. Installation of carbon dioxide (CO ₂) sensors to monitor air freshness. 3. Installation of a comprehensive monitoring system for harmful substances (CO ₂ , nitrogen dioxides, suspended solids, carbon monoxide, etc.) with readings to a public display or portal on the network.	Measurement records from an accredited laboratory Sensors available and readings on display or portal on the network
Control of VOC (volatile organic compounds) content in furniture during procurement: - requesting a furniture quality certificate stating the VOC content when procuring furniture; - favour wood composite furniture.	Certificates of quality of purchased furniture
There is the possibility of opening windows, if this does not contradict the - LNA (local safety regulations), - local authority regulations; - structural features of the building.	
Control of the content of ozone-depleting substances: - Conducting inventory of Freon/coolant content in split systems, refrigerators.	Inventory report
Chemical products	

Recommended measures	Documents, records
<p>Controlling the occurrence of germs and mould and fungus:</p> <ul style="list-style-type: none"> - carrying out regular control and treatment of mould and fungus in wet areas. - carrying out regular cleaning and maintenance of the air conditioning system (fan coils, supply systems), - or installing ultraviolet treatment of the air conditioning system condensate and over-humidification. 	<p>System inspection, cleaning and maintenance logs</p>
<p>Ensuring that the office is cleaned in a safe manner:</p> <ul style="list-style-type: none"> - Keeping records of cleaning agents used (maintaining a register and having quality certificates/safety data sheets). - familiarisation of staff on the handling of cleaning agents. - all substances used are stored in a special storage box/cabinet. - Priority is given to cleaning agents free of chlorine and chlorine compounds, phosphates and phosphonates. 	<p>Register of chemical products</p> <p>Quality Certificates/ Safety Data Sheets</p>
<p>Energy</p>	
<p>Replacement of lamps/fixtures: Replacement of all fluorescent and incandescent light bulbs with LED fixtures or other mercury-free energy efficient bulbs.</p>	
<p>Installation of natural light and presence sensors:</p> <ul style="list-style-type: none"> - the light is automatically adjusted, depending on the available natural light. - the light switches off when there are no people present or when there is enough sunlight to operate. 	
<p>Introduction of metering of heat, hot water and electricity (one of the options):</p> <ul style="list-style-type: none"> - installation of common meters and payment is made according to the readings in proportion to the occupied area; - installation of separate meters for each floor or room. 	<p>Bills of payment Post installed metres</p>
<p>Control of greenhouse gas emissions:</p> <ul style="list-style-type: none"> - Accounting and reduction when necessary; - favours the purchase of electricity from renewable energy sources. 	<p>Semi-Annual/ Annual EP Report</p>
<p>Consumption waste</p>	
<p>Separate accumulation of waste (paper/cardboard, plastic, glass, batteries, IT equipment and electronics):</p> <ul style="list-style-type: none"> - Installation of containers for separate waste accumulation - favour the use of transparent containers for plastic, glass, paper; - all containers for separate waste accumulation are labelled with the name of the type of waste; - leaflets/bulletins on separate waste collection are installed in public areas; - containers are inspected for separate waste collection; - cleaning staff are briefed. Once with new arrivals and when violations are detected; 	<p>Appropriate labelled bins have been put in place</p> <p>Memos/bulletins available</p> <p>COSH inspection report</p>

Recommended measures	Documents, records
- briefing of the office staff.	A familiarisation sheet on briefing sessions
Waste Movement Accounting: - Maintaining records of waste movement to final disposal/recycling/disposal point through inspections/audits/confirmation letters and photos.	Waste movement logs Report on audits/inspections carried out
Use of recycled, used items or recyclable materials: - 2-sided printing is set up automatically. - Purchase of used and/or recycled materials.	
Utensils used in eating areas: - disposable tableware is used when no alternatives are available (recycled disposable tableware is preferred); - reusable tableware is available.	
Water	
Clean drinking water: - installation of purifiers with centralised water treatment or coolers - quarterly testing of water for harmful substances and flavours in purifiers	
Introduction of water metering (one of the options): - Installation of a common meter and payment is made according to the readings of the common meter in proportion to the occupied area; - Installation of separate water meters for each tenant/floor or room.	Bills of payment Post installed meters
Low-flow plumbing: - installation of water-saving equipment (sensor taps, separate buttons on toilets, nozzles on taps, etc.); - control over the absence of leaks in cisterns, toilets, mixers, taps.	After installation Comparative analysis after installation with previous periods in terms of water consumption
Illumination	
Artificial lighting, minimising glare and brightness: - Ensuring adequate light levels in the office. - windows are fitted with blinds or curtains.	Laboratory test data (SAWC special assessment of work conditions)

Recommended measures	Documents, records
Providing natural light: - Providing natural light from windows to more than 75% of the office working area	Laboratory test data (SAWC special assessment of work conditions)
General hygiene and sanitary requirements	
Staff catering facilities: - An equipped kitchen is available for taking meals; - microwave ovens or other equipment for heating food brought in; - dishwashing facilities; - a refrigerator is available; - a cleaning schedule is available; - control of food brought in. If not finished, remove leftovers.	Inspection report Cleaning schedule
Cleaning of purifiers and coolers: - Ensuring that component parts of equipment are sanitised in accordance with sanitary requirements; - Developing and setting up a timetable for the treatment with progress marks. The schedule is located next to the purifier or cooler to be treated.	Sanitisation schedule
Requirements for the maintenance of sanitary units and premises: - provision of sanitary units with hand dryers (electric dryers) or paper towels (preferably from recycled or secondary raw materials), hypoallergenic liquid soap in a dispenser (odourless), toilet paper in sufficient quantity; - toiletries are placed on special racks/shelves taking into account sanitary and hygienic requirements	
Fitness	
Promoting healthy eating: - organising lectures/webinars from nutritionists; - setting up information stands and launching media on the topic of healthy eating.	Lectures/webinars held Information stands/media
Sports facilities (one of the options): - available fitness room with showers and changing rooms on the territory of the office building or within walking distance. - additional rooms for active recreation.	
Infrastructure for pedestrians and cyclists: - There is a cycleway to the office (if feasible) and safe pedestrian areas.	
Ergonomics, comfort and attitude	
Active workstations: - more than 30 per cent of worktables allow for height adjustment, to allow for standing work; - chairs have several adjustments (height, backrest).	

Recommended measures	Documents, records
Free access and infrastructure for people with disabilities: - A ramp is provided for access to the office; - disabled toilets are available	
Acoustics - Installation of an active noise cancellation system or noise-cancelling decor elements in an open space; - control of acoustic regulations in the office; - partitions are sufficiently well insulated.	Laboratory test data (SAWC special assessment of work conditions)
Heating, air conditioning and ventilation automation: - Providing central or individual automated control of temperature, air conditioning and ventilation; - setting ventilation shutdown during off-hours; - users have clear instructions for climate control.	Laboratory test data (SAWC special assessment of work conditions)
Биофилия: элементы, модели и узоры природы: - озеленение офиса; - установка искусственных элементов декора в природном стиле (дерево, водопад, камень, искусственные растения и др.); - установка предметов декора с элементами воды (фонтан, водопад, аквариум).	
Зонирование пространства: - разделение офиса на различные функциональные зоны для разного типа занятий: зоны совместного творчества, командная работа, приватные зоны, зоны фокуса, зона рекреации, зона для гостей.	
Conducting preventive meetings (webinars) with specialists: - Organising and holding in-office in-person or remote group master classes and personal/confidential appointments with specialists: narcologist, psychologist, nutritionist, etc. - Organising and holding Health Days.	Actual meetings/ webinars/ masterclasses held
Sustainable development	
Publication of social and environmental report on NIPIGAS external and internal portals	Published reports
Implementation of projects in the field of Sustainable Development: - Social projects for socially disadvantaged segments of the population (WWII veterans, pensioners, orphaned children and low-income citizens) and other development projects; - Recreational programmes (marathons, races, tournaments, etc.); - environmental projects (clean-up days, gardening and other environmental activities). - educational projects for the population of the regions where NIPIGAS operates (webinars and lectures for schoolchildren, etc.).	Activities undertaken: video and photo recordings, articles

Recommended measures	Documents, records
Conducting employee training in environmental and sustainability competences: - Organising development sessions for employees; - informing in the form of visual material; - feedback to employees in the form of suggestion logs or electronic logs.	Photo and video fixation Articles Visual material Feedback logs

Conclusion. The article explores the issues of the relationship between the injury rate of workers and the working conditions created at their workplaces, considers the causes of occupational injuries, as well as the possibilities of improving occupational safety on the basis of the development and implementation of the strategy of environmental management organisation and relevant target programmes. The authors show that the downward trend in the number of all types of occupational accidents in recent years is characterised by sustainability. Labour is becoming more skilled, complex and less and less associated with injury-prone types of work and equipment. In the overall structure of the causes of accidents with severe consequences, organisational causes are leading annually. Technological and technical (technogenic) factors are the causes of about 7% of accidents with severe consequences.

Consideration of the issues of choosing the directions of increasing the efficiency of measures in the field of labour protection, quality and environmental safety occupies a great place in the work. The article provides recommendations on the content of the organisation’s strategy in the field of occupational health, quality and environmental safety. The main attention is paid to the management of the quality and safety of the environment surrounding the employee of the organisation, and as a result of the impact on the environment - the increase in occupational safety, expressed in the relevant quantitative indicators.

Also, in the main part of the article, the authors provide an example of a programme to improve the quality and safety of the environment in office centres. The proposed recommendations include 10 areas of focus (air, chemicals, energy, waste, water, lighting, hygiene, fitness, ergonomics and sustainability) and 37 activities grouped according to the proposed areas of focus.

The recommendations developed by the authors are planned for implementation - the authors will continue their work in the field of monitoring the impact of the implemented measures.

References

1. *Labour Code of the Russian Federation of 30/12/2001 N 197-FL (ed. of 13/06/2023, amended from 27/06/2023)*. URL: https://www.consultant.ru/document/cons_doc_LAW_34683/ (date of circulation 06/07/2023).
2. Artemyev V.B., Vorobyeva O.V., Loginov A.K.. [et al]. *Personal carelessness of the victim - the main cause of traumatising? // Labour safety in industry*. 2007. № 12. pp. 48-52.
3. Mokhnachuk, I.I.; Pictushanskaya, T.E.; Bryleva, M.S.; Betz, K.V. *Workplace mortality at the enterprises of the Russian coal industry (in Russian) // Med. labour and industrial ecology*. 2023. T. 63. № 2. pp. 88-93. DOI: 10.31089/1026-9428-2023-63-2-88-93.
4. Glebova E.V., Fomin E.A., Ivanova M.V. *Quantitative assessment of worker's safe behaviour based on the results of behavioural safety audit // Occupational safety in industry*. 2019. № 3. pp. 52-56. DOI: 10.24000/0409-2961-2019-3-52-56.
5. Zavyalov A.M., Notchenko E.E. *Analysis of industrial traumatism of Moscow Metro workers // Science and technology of transport*. 2022. № 1. pp. 101-105.
6. Mamaev V.V., Rozanova E.N., Dickenstein I.F. *The role of the human factor in the level of traumatism of firefighters // Scient. bullet. SRIM Respirator*. 2017. № 4 (54). pp. 82-91.
7. Nguyen T.A., Ngo C.T. *Problems of traumatism and deaths of firefighters in Vietnam // Proceedings of the International Scientific and Technical Conference "Safety Systems"*. 2017. № 26. pp. 137-139.
8. Kondashov, A.A.; Bobrinev, E.V.; Udavtsova, E.Yu. *Specificity of industrial traumatism of the personnel of the Federal Fire Fighting Service of the Ministry of Emergency Situations of Russia due to "personal carelessness"//Medico-biological and socio-psychological problems of safety in emergency situations*. 2023. № 2. pp. 89-98. DOI: 10.25016/2541-7487-2023-0-2-89-98.
9. Udaltsova, N.V.; Utkin, N.I. *Some aspects of labour protection in the system of EMERCOM of Russia // Pravo. Safety*. . 2018. № 3 (40). pp. 21-25.
10. Evdokimov V.I., Bobrinev E.V., Kondashov A.A. *Analysis of industrial traumatism and deaths of personnel of the Federal Fire Fighting Service of EMERCOM of Russia (2006-2020) : a monograph / edited by V.I. Evdokimov; All-Russian Centre for Emergency and Radiation Medicine named after A.M. Nikiforov of EMERCOM of Russia All-Russian Order of the Badge of Honour Scientific and Research Institute of Fire Fighting Defence of EMERCOM of Russia*. St. Petersburg. Izmailovsky, 2022. 138 p. (Ser. "Morbidity of military personnel" Vol. 18).

11. Evdokimov V.I., Putin V.S., Vetoshkin A.A., Artyukhin V.V. *Circumstances of industrial traumatism and death of personnel of the federal fire-fighting service of the Ministry of Emergency Situations of Russia (2010-2020) // Med.-Biol. and sots.-psychol. probl. of safety in emergency situations.* 2021. № 4. pp. 5-19. DOI: 10.25016/2541-7487-2021-0-4-5-19.

12. *Results of monitoring and labour conditions in the Russian Federation in 2021.* Ministry of Labour of the Russian Federation. URL: <https://eisot.rosmintrud.ru/monitoring-uslovij-i-okhrany-truda> (date of circulation 07/07/2023).

13. *Results of monitoring and labour conditions in the Russian Federation in 2021.* All-Russian Research Institute of Labour of the Ministry of Labour of the Russian Federation. URL: [Mumpyd Pocuu \(vcot.info\)](http://mumpyd.pocuu.vcot.info) (date of reference 07/07/2023).

14. Pankov V.A., Kuleshova M.V. *Risk analysis of industrial traumatism in the main industries // Health risk analysis.* - 2021. - № 4. - pp. 119-126. DOI: 10.21668/health.risk/2021.4.1

15. *Information on the work of the technical commission of the labour inspection of trade unions in 2022.* URL: https://fnpr.ru/upload/iblock/557/s70zsdwk58oi-0uhvejbcyez06nr1fbtq/Informatsiya_o_rabote_TIT_v_2022_godu_ITOG_NA_SAYT.pdf (date of circulation 07/07/2023)

16/ *Federal State Statistics Service. Information on injuries at work and occupational diseases 2019.* URL: https://rosstat.gov.ru/working_conditions?print=1 (accessed 07/07/2023)

17. *Federal State Statistics Service. Information on injuries at work and occupational diseases 2020.* URL: https://rosstat.gov.ru/working_conditions?print=1 (accessed 07/07/2023)

18. *Federal State Statistics Service. Information on injuries at work and occupational diseases 2021* URL: https://rosstat.gov.ru/working_conditions?print=1 (accessed 07/07/2023)

19. *Federal State Statistics Service. Labour conditions. Industrial injuries.* URL: https://rosstat.gov.ru/working_conditions?print=1 (date of address 07/07/2023)

20/ *Federal State Statistics Service. Condition of labour conditions of employees of organisations by certain types of economic activity in the Russian Federation.* URL: https://rosstat.gov.ru/working_conditions?print=1 (accessed 07/07/2023)

21. Kurochkin, P.A. *Analysis of industrial traumatism, occupational diseases and labour conditions in Russia. [Text] / A.I. Agoshkov, B.F. Lesovsky, S.N. Strizheusov, P.A. Kurochkin // Naukosphere (ISSN 2542-0402) - 2022. - № 4 (2) - pp. 31-40.*

优化工业安全体系

OPTIMIZATION OF THE INDUSTRIAL SAFETY SYSTEM

Bazhanova Ekaterina Sergeevna

*Candidate of Economic Sciences, Associate Professor
Samara State Technical University*

Sorokina Liudmila Vladimirovna

*Candidate of Pedagogical Sciences, Associate Professor
Samara State Technical University*

Annotation. *The paper analyses theoretical aspects of industrial safety system development. The properties of industrial safety system are defined. The methodical approach to determination of indicators for construction of the optimisation model of the system of industrial safety provision is offered.*

Keywords: *Industrial safety, accident rate, traumatism, occupational diseases, industrial accident, damage from traumatism and occupational morbidity, systems theory, oil and gas industry.*

The problem of accidents, injuries and occupational diseases at the enterprises of oil and gas industry in our country is considered systematically. The content of industrial safety should be defined from the position of systems theory [1], for which it is necessary to allocate a description of its attributes. They are allocated on the basis of the analysis of theoretical and practical principles of its construction. If we analyse the available definitions of the concept of “system” [1, 2], then for industrial safety “system” can be formulated as follows: the system of industrial safety is a set of elements consisting of regulatory documentation, organisational and technical measures, resources, which are in structural interrelation and form a certain integrity. As any system, the system of industrial safety is under constant influence of internal and external factors, which necessitates the development of a model for its optimisation of the system in order to improve the efficiency of functioning.

Each element of the system fulfils its functions, which allows to achieve a common goal for the system. The concept of “goal” is the main category of systems theory, which can be defined as the desired state of the industrial safety system. It consists in minimising the socio-economic damage in case of negative

incidents. This requires resources for special measures. The criterion determines the selection of the most effective measures to achieve the goals. The means of achieving the goal depend on the value of the established criterion, which allows finding optimal options for achieving the goal.

The structure of the industrial safety system consists of three main parts:

- regulatory framework governing the level of industrial safety requirements;
- organisational and technical measures;
- resources, human and material, required to fulfil the regulatory requirements for industrial safety.

From the definition of the goal follows the understanding of the following tasks of the industrial safety system:

- prevention of hazardous incidents;
- taking preventive measures to ensure the safety of operations;
- justification of requirements to the system properties and its indicators;
- maintaining safe properties and safety indicators during operation of the industrial safety system equipment;
- the most efficient use of funds allocated for prevention and elimination of consequences of accidents.

The solution of these tasks lies in the field of functioning of the industrial safety system. Its main element is the technological system, the components of which are the equipment, the person who operates it, the environment, the organisation and technology of work. Ensuring safety requires maintaining the quality and mutual compatibility of these elements.

The properties of systems are usually considered within the framework of systems theory [1]. For the structure of work safety organisation it can look as follows:

Integrity characterised by a set of objects. Regulatory and technical documentation, organisational and technical measures and resources providing them represent a single whole that ensures the safety of workers.

Divisibility. The system of industrial safety organisation is a set of elements presented above.

Isolation. The system of elements of the industrial safety organisation is usually analysed without taking into account the influence of the environment on it.

Relativity of isolation. The isolation of a safety organisation system is relative because the environment affects the system.

Identifiability. Usually the influence of each object in the system is considered separately to determine preventive measures.

Diversity. Each element of the system behaves differently in the system.

Observability. Intermediate and output characteristics of the system are always monitored as the process is performed.

Uncertainty. When a process is executed, all of its properties cannot be controlled simultaneously. The output characteristic that is most often monitored is the one that determines safety.

Displayability. The safety of a production organisation is controlled by changing its properties concerning the probability of occurrence of incidents and the costs of safety measures.

Integrativity. This refers to the connectedness of the elements of the system. Activities are assigned to fulfil safety requirements in regulatory and technical documents.

Communicativeness. The system together with the environment is considered as a whole.

Indicators in the system [4] are used to determine the degree of achievement of the goal and the solution of safety tasks. The system of indicators should allow:

- express quantitatively set goals;
- use indicators as a tool for strategic and operational planning;
- monitor the implementation of safety measures;
- Indicate emerging problems;
- adjust plans;
- assess the level of management and efficiency of subdivisions' actions.

To determine the requirements of industrial safety to the developed indicators it is necessary to take into account that one of the main objectives of the system is to eliminate accidents, injuries and occupational diseases that reduce the efficiency of labour and production processes. Consequently, the degree of achievement of the system's objectives should be judged, first of all, by the extent to which the level of safety affects the quality of production or technological processes. Hence the requirement that the selected indicators must be related to the efficiency indicators of the processes listed.

Another safety requirement to the developed indicators is conditioned by the tasks solved by the system and consisting in ensuring industrial safety of specific technological processes. Such processes are considered as functioning of technological systems, industrial safety of which is achieved by the required quality and mutual compatibility of components. On this basis, the selected safety indicators should include the indicators of individual processes and be based on parameters characterising the quality of all or possibly more elements corresponding to them.

It can be argued that the quality indicators of the industrial safety system should meet the requirements of the efficiency and quality assessment criteria, optimisation criteria and constraints in planning and operational management tasks: they should be universal, illustrative and sensitive to changes in the parameters of the operating process systems.

For the system of industrial safety organisation it is necessary to define the most important parameters to maintain the chain: "strategy, planning, evaluation,

motivation and control”. The system of indicators is the main tool for expressing the results of safe operation and its results of optimisation. They should represent a dynamic model to provide development perspectives and the rate of progress towards the set goal. The indicators should be rigid, set in the form of an interval and may have the status of a “benchmark”. The main indicators should be regulated by the top management of the enterprise. Probabilistic indicators, which are used as characteristics of complex stochastic systems, meet the requirements of industrial safety most fully [5]. Modelling methods in this case can be used to calculate the probabilities of erroneous human actions or equipment failures. Taking into account the above requirements, social and economic characteristics of process safety can be used as indicators characterising the industrial safety system. The social characteristic can be the probability of the technological process without accidents within a given time period – $P(t)$, economic - total security costs Zn and possible damage, if there are any consequences from the incidents - $P_e(y)$, i.e. expenses.

The probability of the technological process without accidents $P(t)$, is defined by the following formula

$$P(t) = 1 - P_m(t) P_\delta(t),$$

where $P_m(t)$ – conditional probability of failure-free operation of technical and technological means of industrial safety at the given discrete moment of time t of the process under study, found under the condition that by the beginning of the k -th technological operation they were in a serviceable position;

$P_\delta(t)$ – probability of fulfilment by the workers of those algorithms of actions provided for them in case of emergency (hazardous and critical) situations, which is assessed by the criteria of speed or reliability.

The criterion of speed is the time of problem solving, i.e. the time from the moment of signal appearance to the moment of control actions termination. Usually this time linearly depends on the number of H of information transformed by human beings [4]:

$$\tau_{он} = \alpha + bH,$$

where $\alpha \approx 2c$ – hidden reaction time, i.e. the time interval from the moment of signal appearance to the operator’s reaction to it; $b \approx 0,15 + 0,35 \text{ с/бит}$ – is the inverse of the speed of information processing.

If there is a queue of signals, the signal processing is not started immediately. In this case, some time is spent for the signal to wait for service $\tau_{ож}$, and performance is characterised by the value

$$\tau_{мп} = \tau_{ож} + \tau_{он},$$

where $\tau_{мп}$ – the time the information stays in service; $\tau_{он}$ – the actual time of signal servicing (processing).

The required speed is determined by the control cycle time (which is usually specified)

$$T_u = \tau_{np} + \sum_{i=1}^n \tau_i,$$

where τ_i - signal delay time in the i -th machine link; n - number of machine links.

For a given duration T_u and known τ_i (These are usually known from the data sheets of the technical devices) requires fast performance:

$$\tau_{np} \leq T_u - \sum_{i=1}^n \tau_i$$

In some cases, the time τ_{on} can be found as the sum of individual values characterising each of the stages of information transformation:

$$\tau_{on} = \tau_1 + \tau_2 + \tau_3,$$

where τ_1 - the time of reception and perception of information; τ_2 - time to analyse and make a decision; τ_3 - time of implementation of control actions.

The reliability of an activity is usually characterised by the probability that the task is correctly solved. To estimate this probability, a value is used:

$$\rho_{on} = m/N,$$

Where m - number of correctly solved problems; N - total number of solved problems.

The required reliability is determined by the reliability of the control cycle performance

$$\rho_u = \rho_{on} \prod_{i=1}^n \rho_i(T_u),$$

where $\rho_i(T_u)$ - reliability of operation of the i -th machine link during time T_u .

For a given ρ_u and known $\rho_i(T_u)$ (their values are usually known as a result of calculations, the methods of these calculations are well developed in reliability theory) the required reliability can be determined by the formula

$$\rho_{on} \geq \frac{\rho_u}{\prod_{i=1}^n \rho_i(T_u)}$$

Probability value $P_m(t)$ can be determined by known methods of reliability calculation in engineering - with the help of probabilities of failure-free operation of individual (k -th) technical and technological means of ensuring safety - $P_m^{(k)}(t)$, their total number - r and the method of connection in the safety structural scheme. For example, for parallel connection of means, its value is determined by the following formula

$$P_m(t) = 1 - \prod_{k=0}^r [1 - P_m^{(k)}(t)],$$

and when they are connected in series - by multiplication of values $P_m^{(k)}$.

Expenditure of resources is necessary to give safe properties to technological systems, to create favourable working conditions for people, to carry out control and other aspects of safety activities. The amount of expenditure is dependent on the probability of carrying out technological processes without accidents. This dependence can be represented by the expression:

$$Z[P(t)] = Z_0 + [\partial Z(p)/\partial p]\Delta P,$$

where Z_0 - the share of the initial cost of the security system.

The damage is manifested in the deterioration of the properties of both those directly working and the equipment used by them, as well as their near and far surroundings - the working environment and the environment. In addition to the deterioration of the listed objects - direct damage, there is also its second component - indirect damage, which manifests itself in the suspension of ongoing work or reduction of its efficiency, in the disruption of the existing links between technological systems and their environment due to these losses.

The average damage can be used as a rough estimate of the damage in question \underline{Y} from one incident, found with the help of industry static data. Such value in the oil industry is more than ten million rubles [3]. The size of such damage in the first approximation can be accepted regardless of the probability of occurrence of an accident.

Given this assumption, the damage from the incident can be determined by the formula:

$$M_t [Y] = \underline{Y} [1 - P_t(t)],$$

where \underline{Y} - average damage

Costs are defined by the sum of the values of costs and damages:

$$M(P_t) = M_t(Z) + M_t(Y).$$

Thus, the optimisation model of the industrial safety system can be formulated as follows: to find such a value of the probable performance of works $P_t(t)$ for a given period of time, so that the cost of $M(Z)$ and damages $M(Y)$ were minimal.

References

1. Vdovin, V.M. *Theory of systems and system analysis: textbook* / V.M. Vdovin, L.E. Surkova, V.A. Valentinov. Valentinov. - 3d ed. - M., Dashkov and K°, 2013.- 643 p.
2. Ostreikovskiy, V.A. *Analysis of stability and controllability of dynamic systems by methods of catastrophe theory: Manual*. - M., High. sch., 2005.- 326 p.
3. Alekina E.V., Yagovkin G.N. *Identification of a potential risk of occurrence of a dangerous situation at manufacture at absence of statistical data and their presence [Text]*. *Zhurnal Nauchny almanack*, № 1-3(27), 2017, P. 15-19.
4. Alekina E.V., Yagovkin N.G., Krivova M.A. *Utilization of complex criteria for assessing the effectiveness of the organisational system of occupational risk management [Text]*. "Info-communication technologies", Vol. 12, No. 1, 2014, P. 107-111.
5. *Theoretical foundations of the formation of an integrative system of production safety management: monograph* / E. V. Alekina, D. A. Melnikova, G. N. Yagovkin; Samar State Technical University, Life Safety.- Samara, 2018.- 275 p.

几种俄罗斯粘土结合能力的研究
**A STUDY OF BINDING CAPACITY FOR SEVERAL RUSSIAN
CLAYS**

Kotov Artem Nikolaevich

Postgraduate

Mendeleev University, Russia

Vartanyan Maria Aleksandrovna

Candidate of Technical Sciences, Associate Professor

Mendeleev University, Russia

Belyakov Aleksei Vasilevich

Doctor of Chemical Sciences, Full Professor

Mendeleev University, Russia

抽象的。 本文对粘土原料的关键特性之一（即粘合能力）进行了研究。 实验结果为进一步使用所研究的粘土通过塑料成型或浆料铸造技术进行批量成型奠定了基础。 还讨论了基于粘土性质的批料组合中石英的理想含量。

关键词：粘土、结合力、可塑性、石英、本地化。

Abstract. *The present paper presents a research in one of the key properties for clay raw materials, i.e. their binding capacity. Experimental results form a ground for further use of the studied clays in batch shaping by plastic molding or slurry casting techniques. Desirable content of quartz in batch composition based on the clay properties is also discussed.*

Keywords: *clay, binding capacity, plasticity, quartz, localization.*

Introduction

Up to year 2022 Russian ceramic plants in Central and North-Western federal districts purchased clay raw materials from Ukraine, since these raw materials are long known for their excellent quality and performance. Yet at present and in the nearest future no shipments of Ukrainian clays are expected, and practitioners turn their attention to possible alternatives in order to avoid lay-offs. Middlemen companies currently offer a broad variety of clays and kaolins. Ready-made clay compositions from Donbas have been largely replaced by pre-made batches from Belarus and Turkey, also a domestic supply of clays and kaolins is on the rise.

The situation at hand suggests for two possible options: either to change imports routes, or to switch from imported to domestic raw materials. The prior option, a change of imports sources, is mainly adopted by small enterprises where the use of large-scale production units and installation of batch preparation shops is hampered due to a limited operating space. Large enterprises with well-working batch preparation shops generally opt for the latter, and turn towards domestic raw materials.

Russia possesses large reserves in clays and kaolins. Still, a transfer to domestic supply poses two major problems. Firstly, such raw materials are of inferior quality compared to those from Ukraine. Secondly, and more importantly, available processing techniques and manufacturing technologies have been excessively geared towards the use of Ukrainian raw materials. The attempted introduction of raw materials from new sources in a well-balanced manufacturing process without their thorough investigation resulted in such amount of rejected pieces that some plants had to stop their production lines.

Nevertheless, for large-scale enterprises a change between imports in a given situation implies even higher economic risks, which makes the replacement of imported raw materials with those of domestic origin a viable option. In order to adjust the manufacturing process and to amend batch compositions the key properties for clay raw materials should be investigated, specifically their binding capacity.

Binding capacity of clays is determined as their ability to retain plasticity and strength sufficient for item shaping, transportation and processing, in presence of aplastic batch constituents (quartz sand, feldspar, chamotte, etc.). Binding capacity expressed as a plasticity index may be regarded as an indirect measure for plasticity of clays: the higher this value is, the more aplastic constituents can be incorporated into the mixture [1].

Binding capacity of clays tends to increase with the number of cohesion points. Samples made of fine high-plasticity clays demonstrate higher mechanical strength than those of coarse kaolins. However there's no direct correlation between dispersivity and the force of cohesion between particles of clay. This force mostly depends on the nature of minerals that a clay species consists of. A number of authors suggested [2-4] that the presence of montmorillonite in clays increases their bending strength thus improving binding capacity.

Montmorillonite has both positive and negative effect on clay processing. On one hand, montmorillonite-containing clays demonstrate higher plasticity than kaolinite-based ones, which makes it possible to increase the amount of aplastic constituents in the batch. Such behavior is due to a three-layer stack in montmorillonite structure, while kaolinite is formed with two-layer stacks. Interstack space of montmorillonite can adsorb more water, thus drastically increasing flow point of such clays.

On the other hand, increased water content makes green bodies more sensitive to drying and intensifies drying shrinkage, which in turn requires careful adjustments of drying conditions. Casting slurries based on montmorillonite clays demonstrate prominent thixotropy, this makes them less suitable for plaster-mold casting [5 – 8]. Binding capacity of clays can be enhanced by certain means, i.e. addition of surfactants, water solution of Na_2CO_3 (2-3% wt.), electrolyte treatment, etc.[5, 9].

Generally, natural clays and kaolins contain a certain amount of free SiO_2 . The quantity of free silica in clays is irregular and varies in a broad range. Clay processing requires mandatory incoming chemical control of each batch, including free silica, for due composition adjustments.

Materials and methods

Russian industry complies with national and interstate standards on methods and techniques for testing properties of clay materials. Presently, binding capacity is determined as[10]:

1. Plasticity index (PI) for mixtures of clay and sand;
2. comparison of bending (σ_{bend}) and compression strength (σ_{comp}) change for dried samples made of clay mixtures with different amount of aplastic constituents;
3. shaping behavior of clays with different amount of aplastic constituents.

Aplastic components usually are quarry or stream quartz sand with tailored grain size range. The effective national standard [10] doesn't state the exact grain size values, so the present research was based on Ramensky quartz sand with grain size of 15 to 30 μm . This corresponds to typically used sands in porcelain and faience manufacturing, moreover, the use of quartz with grain size below 40 μm helps to increase mechanical properties of final product [5].

The research covered clay brands of the following deposits: Kumakskaya (brand KM-1), Kyshtymkaya (PGA), Troshkovskaya (S-2), Novoorskaya (Ivory-5), Nizhnevskaya (NU-1), Latnenskaya (LT-0, LT-1, LT-2), Novomoskovskaya (NM PGA), and clay provided by OOO «TD «Sukholozhskiye Ogneupory» (PGMS-23). Chemical composition of clay samples was provided by suppliers, phase composition was determined by X-ray diffraction and proved that all clays except Kyshtymkaya and all Latnenskaya brands were montmorillonite-type, while the mentioned four clay samples were kaolinite-type.

Clay mixtures were made as presented in Table 1 of pre-dried, ball-milled and sieved through an 18-mesh sieve clays, and dry non-milled sand.

Table 1.
Clay batch compositions [10]

Component	Batch No.				
	1	2	3	4	5
Clay sample, % wt.	100	80	60	40	20
Sand, % wt.	0	20	40	60	80

All batches were mixed and plasticity index was determined as described in [1, 10]. Shaping behavior of clay mixtures was estimated organoleptically as suggested in [10] during mixing and molding samples in plaster molds for further strength tests: good shaping ability (+++); acceptable shaping ability (++); poor shaping ability (+); no shaping ability (-).

Bending test beams were dried first in air and then in a chamber drier at 105 ± 5 °C. Maximum bending strength for high- and medium-plasticity clays mixed with sand should be above 2.5-3.0 MPa, for moderate plasticity clays – above 0.5-1.5 MPa. Compression test was performed on cubes that were dried at 105 ± 5 °C. Maximum compression strength should exceed 4.5-5.0 MPa regardless of plasticity class.

Results and discussion

The results for strength tests of clay mixtures are shown in Fig. 1, plasticity indexes and shaping behavior are laid out in Tables 2 and 3 respectively. Based on plasticity indexes (Table 2), all studied clay brands can be divided into three categories:

- high-plasticity clays – KM-2, NU-1, PGMS-23;
- medium-plasticity clays – Ivory-5, NM PGA, and S-2, which is in line with earlier studies on Troshkovskaya clays [3, 4];
- moderate plasticity clays – LT-0, LT-1, LT-2, and Kystymyskaya PGA, as expected of kaolinite-type clays.

Table 2.
Plasticity of experimental batches

Clay brand	PI and shaping ability of mixtures with clay-to-sand ratio				
	100:0	80:20	60:40	40:60	20:80
KM-2	31	26	15	14	9
PGA (Kysht.)	14	14	12	10	8
S-2	24	22	20	17	9
Ivory-5	24	17	17	15	6
NU-5	26	25	25	19	10
LT-0	15	15	13	12	5
LT-1	15	14	14	10	10

LT-2	15	15	15	9	9
NM PGA	17	14	11	11	10
PGMS-23	29	23	23	17	8

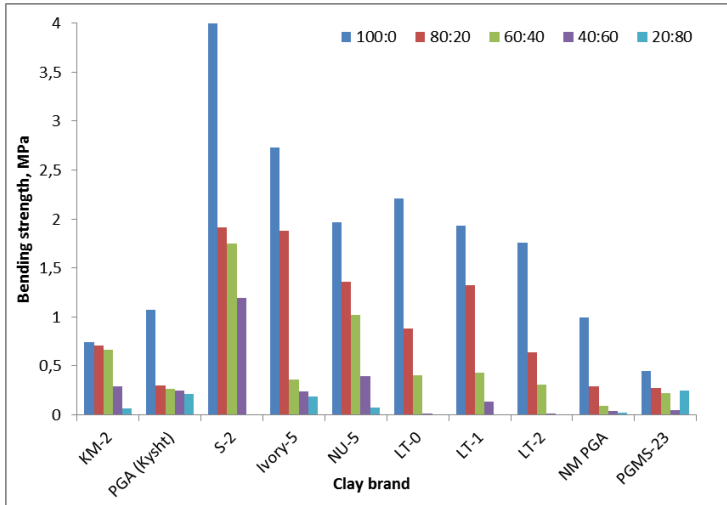
High-plasticity clays retained their elastic properties up to clay-to-sand ratio 40:60, this allows to use such clays in ceramics production with increased amount of aplastic constituents. Moderate plasticity clays demonstrated almost no effect of sand admixture up to clay-to-sand ratio 80:20, where experimental mixtures practically lost their elastic properties. Medium-plasticity clays were the least tolerant of sand admixture – their characteristics were already significantly deteriorated at clay-to-sand ratio of 60:40, which makes necessary a cautious approach to using such clays in plastic molding.

Shaping ability of studied clays (Table 3) generally corresponded to their plasticity indexes and phase composition. All clay mixtures made with high- and medium-plasticity montmorillonite clays retained their shaping ability for PIs down to 9-10; Ivory-5 demonstrated acceptable shaping ability even at PI = 6. On the contrary, coarse kaolinite clays readily lost their shaping ability even at moderate clay-to sand ratio (60:40).

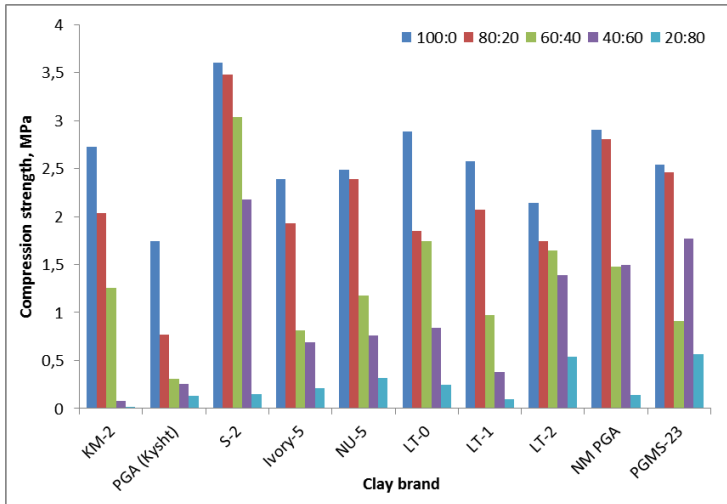
Table 3.
Shaping behavior of experimental batches

Clay brand	Shaping ability of mixtures with clay-to-sand ratio				
	100:0	80:20	60:40	40:60	20:80
KM-2	+++	++	++	+	–
PGA (Kysht.)	+++	+++	++	+	–
S-2	+++	+++	+++	++	+
Ivory-5	+++	+++	+++	++	++
NU-5	+++	+++	++	+	+
LT-0	+++	+++	++	+	–
LT-1	+++	+++	++	+	–
LT-2	+++	++	+	-	–
NM PGA	+++	+++	++	+	+
PGMS-23	+++	+++	+++	++	+

Experimental data on bending strength (Fig. 1, a) suggest that not all studied clay materials comply with the effective national standard. All mixtures made with KM-2, NU-5, NM PGA and PGMS-23 clays fall below the standard requirements. Kyshtymyskaya PGA, Ivory-5 and Troshkovskaya S-2 clays demonstrate acceptable strength only as pure samples (clay-to-sand ratio = 100:0).



a



b

Figure 1. Maximum bending (a) and compression strength (b) of experimental batches

Standard requirements are also met for all Latnenskaya clays mixed with sand at 80:20 ratio. This may result from lesser amount of impurities and also the pres-

ence of clay bacteria in LT-1 sample that may improve its plasticity index. The effect of clay bacteria on Latnenskaya clays properties will undergo a further research.

All sample batches failed in compression test, a possible reason for that could be a high amount of impurities.

Conclusions

Based on the research data the most promising candidate clays for plastic shaping techniques are medium-plasticity montmorillonite clays, specifically Ivory-5. These clays demonstrate good shaping ability and allow incorporation of up to 40 % wt. aplastic materials to decrease their drying sensitivity.

The most promising for slurry casting are Latnenskaya brand clays (LT-0, LT-1, LT-2) due to the absence of montmorillonite. Addition of 20 % wt. of quartz into batch composition will allow to obtain green bodies with sufficient mechanical properties.

References

4. *Guzman I.Ya. Manual on ceramics technology. Moscow, 2005.195 p. (In Russian)*
5. *Lekareva S.G. Study of the clays from the Veselovsky and Novo-Raisky quarries of the Druzhkovsky deposit //Proceedings of the State Research Ceramics Institute. – 1966. - No. 1 (47). – P. 3-42. (In Russian)*
6. *Glasson V.V., Taraeva T.I. Study of Troshkovskaya clay // Proceedings of the State Research Ceramics Institute. – 1961. - No. 3 (44). – P. 31-46. (In Russian)*
7. *Glasson V.V., Taraeva T.I. Study of two species of Troshkovskaya clay // Proceedings of the State Research Ceramics Institute. – 1958. – No. 2. – P. 57-71. (In Russian)*
8. *Bulavin A.A. et al. Technology of porcelain and faience manufacturing. Moscow, 1975. - 448 p. (In Russian)*
9. *Kotelnikov D.D., Konyukhov A.I. Clay minerals of sedimentary rocks. Moscow, 1986. - 286 p. (In Russian)*
10. *Belousov P.E., Bocharnikova Yu.I., Boeva N.M. Analytical methods for diagnostic of mineral composition in bentonite clay // RUDN Journal of Engineering Research. - 2015. - No. 4. - P. 94 - 101. (In Russian)*
11. *Lamberov A.A., Sitnikova E.Yu., Abdulganeeva A.Sh. Influence of mineralogical and batch composition of kaolin clays from various deposits on structural properties and mechanical behavior of clay pastes // Herald of Kazan Technological University. - 2011. - No. 23. - P. 83 - 89. (In Russian)*

12. Terekhin E.P., Zakharov A.K. *Technology for improving the binding properties of domestic bentonite clays for pelletizing iron ore concentrates // Mining informational and analytical bulletin. – 2003. - No. 5. – P. 152-153. (In Russian)*

13. *GOST 21216-2014. Clay raw materials. Test methods. Moscow, 2015. 43 p. (In Russian)*

非平衡热力学框架内的化学过程

CHEMICAL PROCESSES WITHIN THE FRAMEWORK OF NON-EQUILIBRIUM THERMODYNAMICS

Dubrovin Viktor Vasilievich

*Candidate of Technical Sciences, Associate Professor
Tambov State Technical University*

Abstract. *A method is presented for determining non-equilibrium compositions during the evolution of a system to an equilibrium state for a mixture of ideal gases based only on general thermodynamic principles for the passage of any processes under given external conditions. Using examples of the formation and decomposition of hydrogen iodide, the application of the proposed approach is shown.*

Keywords: *macrocell, macroscopic level, nonequilibrium composition, equilibrium state.*

It is proposed within the framework of non-equilibrium thermodynamics to determine non-equilibrium compositions during the evolution of a system to an equilibrium state. In this case, the chemical process is presented as a set of spontaneous processes occurring in macrocells. "The uniqueness of a macrocell as a physical object lies in the fact that, on the one hand, it is the maximum microscopic volume and, in principle, the provisions of quantum mechanics are applicable to it, on the other hand, it is also the minimum macroscopic volume and, therefore, to it at least some classical concepts are applicable" [1, p. 7]. Such a description of the object can be considered as a two-level one. At the first - macroscopic - level, the chemical process is considered from the standpoint of the classical approach. At this level, the set of particles involved in the process and their nonequilibrium compositions are determined when the system moves towards equilibrium. At the second - microscopic - level, the chemical process is considered from the standpoint of quantum mechanics. At this level, there is a connection with time of non-equilibrium compositions when the system moves towards equilibrium.

Chemical processes under isochoric-isothermal conditions

Consider a closed ideal gas system consisting of r components at certain values of volume V and temperature T . The components are formed by s chemical ele-

ments A_1, A_2, \dots, A_s , which, for the sake of concreteness of further calculations, we will choose as the first s components X_1, X_2, \dots, X_s . The possibility of carrying out a particular chemical reaction in a system under isochoric-isothermal conditions is determined, in accordance with the general thermodynamic principle of the passage of any processes under given external conditions, by the sign and magnitude of the change in the Helmholtz free energy DF. Only those reactions are possible in the system for which $DF(V, T) < 0$. In the thermodynamic equilibrium state of the system, for given values of V and T , the Helmholtz free energy takes on the minimum value achieved with a certain chemical composition of the system that satisfies the equations of conservation of matter.

The Helmholtz free energy F can be expressed explicitly in terms of the moles of the components n_j and the standard Gibbs molar energies: $G_i^0(X_j, T)$:

$$F(V, T, n_1, n_2, \dots, n_r) = \sum_{j=1}^r n_j (G_m^0(X_j, T) + RT(\ln RT - \ln V - 1 + \ln n_j)). \quad (1)$$

Since the system is closed, its chemical composition must satisfy the elemental composition conservation equations:

$$\sum_{j=1}^r c_{i,j} n_j = c_i^0, i = 1, 2, \dots, s, \quad (2)$$

Where $c_i^0 = \sum_{j=1}^r c_{i,j} n_j^0$ – the total molar content of the element A_i in the system,

n_j^0 – is the initial value of the moles X_j ; $c_{i,j}$ – is the number of elements A_i in the component (molecule) X_j , for $j = 1, 2, \dots, s$ $c_{i,j} = 1$ at $i = j$ and $c_{i,j} = 0$ at $i \neq j$.

In the equilibrium state, the Helmholtz free energy (1) reaches its minimum value under constraints (2). The problem of determining the equilibrium composition of a reactive mixture in [2] was solved by the method of indefinite Lagrange multipliers, the application of which led to the following equilibrium equations:

$$\frac{n_j}{\prod_{i=1}^s n_i^{c_{i,j}}} = \left(\frac{RT}{V} \right)^{\sum_{i=1}^s c_{i,j} - 1} K^0(X_j, T), \quad (3)$$

where $K^0(X_j, T)$ – equilibrium constants of reactions of formation of dependent components X_j ($j=s+1, s+2, \dots, r$) from independent components X_i ($i = 1, 2, \dots, s$),

$$K^0(X_j, T) = e^{-\frac{G_m^0(X_j, T) - \sum_{i=1}^s c_{i,j} G_m^0(X_i, T)}{RT}}. \quad (4)$$

The equilibrium composition of a mixture of ideal gases under given isochoric-isothermal conditions is determined by the joint solution of s equations (2) and r - s equilibrium equations (3) with respect to the numbers of moles of all components.

To derive the equations of nonequilibrium composition, we represent the right side of equation (1) in the form of two sums:

$$F_{cm}(V, T, n_1, n_2, \dots, n_r) = RT \sum_{j=1}^r n_j \ln n_j, \tag{5}$$

$$F_{ao}(V, T, n_1, n_2, \dots, n_r) = \sum_{j=1}^r n_j (G_m^0(X_j, T) + RT \ln \frac{RT}{V} - 1). \tag{6}$$

The first sum (5) represents the mixing energy, and the second sum (6) represents the additive component of the energy. Further, it will be shown that the additive energy component is a monotonic decreasing function of some parameter λ . Therefore, it can be used as a characteristic of the cross section of the nonequilibrium state.

We denote by \hat{F}_{ao} the value of the additive energy component in some nonequilibrium cross section. Then the problem of finding the composition of the system in this section will be reduced to finding the minimum of function (5) under constraints (2) and (7)

$$\sum_{j=1}^r n_j (G_m^0(X_j, T) + RT \ln \frac{RT}{V} - 1) = \hat{F}_{ao}. \tag{7}$$

To determine the non-equilibrium composition, we use the method of indefinite Lagrange multipliers.

We write the Lagrange function $L(V, T, n_1, n_2, \dots, n_r)$:

$$L(V, T, n_1, n_2, \dots, n_r) = RT \sum_{j=1}^r n_j \ln n_j + \sum_{i=1}^s \lambda_i \sum_{j=1}^r c_{i,j} n_j + \lambda \sum_{j=1}^r n_j (G_m^0(X_j, T) + RT \ln \frac{RT}{V} - 1), \tag{8}$$

where λ_i – Lagrange multipliers.

Determining the minimum of the function (8) by the parameters n_j , we find:

$$RT \ln n_j + RT + \sum_{i=1}^s \lambda_i c_{i,j} + \lambda (G_m^0(X_j, T) + RT \ln \frac{RT}{V} - 1) = 0. \tag{9}$$

Since for $j = 1, 2, \dots, s$ $c_{i,j} = 1$ at $i = j$ and $c_{i,j} = 0$ at $i \neq j$, then from s first equations (9) we define λ_i .

$$\lambda_i = -RT \ln n_i - RT - \lambda (G_m^0(X_i, T) + RT \ln \frac{RT}{V} - 1).$$

Substituting λ_i into the remaining r-s equations (9), after simple transformations, we get:

$$\ln n_j - \sum_{i=1}^s c_{i,j} \ln n_i + \frac{\lambda(G_M^0(X_j, T) - \sum_{i=1}^s c_{i,j} G_M^0(X_i, T))}{RT} + (1 - \sum_{i=1}^s c_{i,j})(1 + \lambda \ln \frac{RT}{V} - \lambda) = 0.$$

From the last equation, taking into account (4), we find:

$$\frac{n_j}{\prod_{i=1}^s n_i^{c_{i,j}}} = \left(\frac{RT}{V}\right)^{\lambda \left(\sum_{i=1}^s c_{i,j}-1\right)} \left(K^0(X_j, T)\right)^\lambda e^{\left(\sum_{i=1}^s c_{i,j}-1\right)(1-\lambda)}. \tag{10}$$

Solving together s equations of conservation of elemental composition (2), r-s equations of equilibrium (10) and the equation limiting the value of the additive energy component (7) with respect to the numbers of moles of all components and the Lagrange multiplier λ , we find the composition of the mixture in the nonequilibrium section.

Comparing equations (3) and (10), we can conclude that in the equilibrium state $\lambda = 1$. It will be shown below that the Helmholtz energy at $\lambda = 1$ takes on a minimum value.

If the parameter λ is considered as an analog of time, then we can introduce the corresponding analogs to characterize the rate of the process, without going beyond the framework of nonequilibrium thermodynamics.

The following derivatives can serve as such characteristics.

$$\frac{dF_{cM}(\lambda)}{d\lambda}, \frac{d\hat{F}_{ad}(\lambda)}{d\lambda}, \frac{dF(\lambda)}{d\lambda}.$$

From equation (9) we find n_j

$$n_j = e^{-1 - \sum_{i=1}^s \frac{\lambda_i c_{i,j}}{RT} - \lambda \left(\frac{G_M^0(X_j, T)}{RT} + \left(\ln \frac{RT}{V} - 1\right)\right)} \tag{11}$$

The derivative of the additive component of energy (7), taking into account (11), will take the form:

$$\frac{d\hat{F}_{ad}(\lambda)}{d\lambda} = -\sum_{j=1}^r n_j \left(G_M^0(X_j, T) + RT \left(\ln \frac{RT}{V} - 1\right)\right)^2. \tag{12}$$

The value of the derivative, as can be seen from (12), is always negative. Thus,

the function $\hat{F}_{ao}(\lambda)$ is a strictly decreasing function. The derivative can be considered as a characteristic of the rate of change of the additive (standard, related to pure substances) Helmholtz free energy of the system for various cross sections.

The minimum value of the mixing energy in an arbitrary section λ can be obtained by substituting (5) into $RT \ln n_j$ from (9).

$$F_{cm}(\lambda) = -\sum_{j=1}^r (RT + \sum_{i=1}^s \lambda_i c_{i,j} + \lambda(G_M^0(X_j, T) + RT(\ln \frac{RT}{V} - 1)))n_j.$$

Expanding the outer brackets and taking into account the connection equations (2) and (7), we find:

$$F_{cm}(\lambda) = -RT \sum_{j=1}^r n_j - \sum_{i=1}^s \lambda_i c_i^0 - \lambda \hat{F}_{ao}(\lambda).$$

Substituting instead of n_j (11), we get:

$$F_{cm}(\lambda) = -RT \sum_{j=1}^r e^{-1 - \sum_{i=1}^s \frac{\lambda_i c_{i,j}}{RT} - \lambda (\frac{G_M^0(X_j, T)}{RT} + (\ln \frac{RT}{V} - 1))} - \sum_{i=1}^s \lambda_i c_i^0 - \lambda \hat{F}_{ao}(\lambda).$$

The derivative of the mixing energy, taking into account (7), will take the form:

$$\frac{dF_{cm}(\lambda)}{d\lambda} = -\lambda \frac{d\hat{F}_{ao}(\lambda)}{d\lambda}. \tag{13}$$

The derivative can be considered as a characteristic of the rate of change in the mixing energy. At $\lambda = 0$, the mixing energy takes on a minimum value.

The derivative of the Helmholtz free energy, taking into account (13), takes the form:

$$\frac{dF(\lambda)}{d\lambda} = \frac{d(F_{cm}(\lambda) + \hat{F}_{ao}(\lambda))}{d\lambda} = \frac{dF_{cm}(\lambda)}{d\lambda} + \frac{d\hat{F}_{ao}(\lambda)}{d\lambda} = (1 - \lambda) \frac{d\hat{F}_{ao}(\lambda)}{d\lambda}. \tag{14}$$

The derivative indicates the rate of change of the Helmholtz free energy for a non-equilibrium state. At thermodynamic equilibrium, the derivative is equal to zero and, as follows from equation (14), is reached at $\lambda = 1$. At the point $\lambda = 1$, the function takes on a minimum value, since the derivative to the left of this point has a negative value, the function decreases, and to the right it is positive, the function is increasing. Thus, at $\lambda = 1$, thermodynamic equilibrium sets in in the system.

Since the absolute value of the Helmholtz energy cannot be fundamentally determined, we represent equation (7) in the following form:

$$\sum_{j=1}^r n_j \left(G_M^0(X_j, T) + RT \left(\ln \frac{RT}{V} - 1 \right) - \sum_{i=1}^s c_{i,j} \left(G_M^0(X_i, T) + RT \left(\ln \frac{RT}{V} - 1 \right) \right) \right) + \sum_{j=1}^r n_j \left(\sum_{i=1}^s c_{i,j} \left(G_M^0(X_i, T) + RT \left(\ln \frac{RT}{V} - 1 \right) \right) \right) = \hat{F}_{ad}. \quad (15)$$

Let's introduce the value

$$a_j = \sum_{i=1}^s c_{i,j} \left(\frac{G_M^0(X_i, T)}{RT} + \left(\ln \frac{RT}{V} - 1 \right) \right) - \left(\frac{G_M^0(X_j, T)}{RT} + \left(\ln \frac{RT}{V} - 1 \right) \right) \quad (16)$$

Taking into account (16), equation (15) takes the form

$$- RT \sum_{j=s+1}^r n_j a_j + \sum_{j=1}^r n_j \left(\sum_{i=1}^s c_{i,j} \left(G_M^0(X_i, T) + RT \left(\ln \frac{RT}{V} - 1 \right) \right) \right) = \hat{F}_{ad}.$$

Swapping the sums in the second term of the last equation and taking into account (2), we obtain the equation for the dimensionless relative additive component of the energy

$$\sum_{j=s+1}^r a_j n_j = \hat{a}, \quad (17)$$

where $\hat{a} = \sum_{i=1}^s c_i^0 \left(\frac{G_M^0(X_i, T)}{RT} + \ln \frac{RT}{V} - 1 \right) - \frac{\hat{F}_{ad}}{RT}$ - relative dimensionless value

of the additive energy component, expression $\sum_{i=1}^s c_i^0 \left(\frac{G_M^0(X_i, T)}{RT} + \ln \frac{RT}{V} - 1 \right)$ is a

constant value for a given initial composition of the mixture.

The initial value of the relative additive component of energy $\hat{a}^0 = \sum_{j=s+1}^r a_j n_j^0$,

the equilibrium value $\hat{a}^* = \sum_{j=s+1}^r a_j n_j^*$, where n_j^* - value of the moles of the compo-

nent X_j in the equilibrium state of the system. During the evolution of the system to the equilibrium state, the relative dimensionless value of the additive energy component changes from the value \hat{a}^0 to \hat{a}^* and can be a characteristic of the cross section of the nonequilibrium state.

In practice, instead of Eq. (7), it is more convenient to consider λ as a known value. In this case, the equilibrium state of the system, as shown above, is char-

acterized by the value $\lambda = 1$. The distribution of the composition of the mixture in non-equilibrium cross sections as the system moves towards equilibrium is found from the solution of a system consisting of s equations (2) and $r-s$ equations (10), with respect to the numbers of moles of all components as λ changes from value λ^0 to $\lambda = 1$.

As an example, consider a closed, ideal gas system consisting of 5 H, I, H_2, I_2, H at $T = 448 \text{ }^\circ\text{C}$. The components are formed by two chemical elements H, I . Figure 1 shows the plots of the distribution of the moles of the components (curves 1 and 2) for the formation process H at the initial values of the moles $n_{H_2}^0 = n_{I_2}^0 = 0.5, n_{HI}^0 = 0$ and decomposition H at $n_{H_2}^0 = n_{I_2}^0 = 0, n_{HI}^0 = 1$ at depending on λ . In both cases, the values of the moles I_2 practically coincide with the values of the moles. H_2 . For the formation process H during the evolution of the system to the equilibrium state, the value of λ increases from -3 to 1, and for the decomposition process H λ decreases from 3 to 1. In the equilibrium state, for the processes of formation and decomposition H the values of the moles of the components coincide and are equal $n_{H_2}^* = n_{I_2}^* = 0.107, n_{HI}^* = 0.785$. Such a coincidence is obtained for reversible reactions. In the process of HI formation there is a characteristic point $\lambda = 0$, at which the mole values of the components H_2, I_2, H are very close. At this point, as seen from Fig. 2, the mixing energy (curve 1) takes on a minimum value.

On fig. Figure 2 shows the graphs of the change in the dimensionless values of the mixing energy (curve 1), additive energy (curve 2), and Helmholtz free energy (curve 3) for the processes of formation and decomposition of HI depending on λ .

For better clarity, the value was taken
$$\sum_{i=1}^s c_i^0 \left(\frac{G_m^0(X_i, T)}{RT} + \ln \frac{RT}{V} - 1 \right) = 38.$$

In this case $\frac{\hat{F}_{\omega}}{RT} = 38 - \hat{a}$. At the initial values $n_{H_2}^0 = n_{I_2}^0 = 0.5, n_{HI}^0 = 0$ и $\lambda \in$

$[-3,3]$ and $\lambda \in [-3,3]$, the value of the additive energy component decreases, the value of the free energy first decreases in the interval $\lambda \in [-3,1]$, and then increases. At $\lambda = 1$, the Helmholtz free energy takes on a minimum value, i.e., the system is in equilibrium.

Conclusion. For systems with ideal mixing at the level of macrocells, the relationship of λ values with time is determined using the universal minimum macroscopic time scale $\Delta t = \hbar/2kT$ – the lifetime of a macrocell. This approach gives the maximum speed of the reaction. In real processes, the degree of mixing must be taken into account. The presented approach allows choosing the optimal parameters of chemical processes..

References

1. V. P. Maikov, *On a non-local version of classical thermodynamics: Lecture.* – M.: MSUIE, 2001. – 32 p.
2. Khachkuruzov G. A. *Fundamentals of general and chemical thermodynamics: Textbook for university students.* – M.: Higher. School, 1979. – 268 p.

SIGNATURES FOR FIGURES
DUBROVIN V. V. No. 1

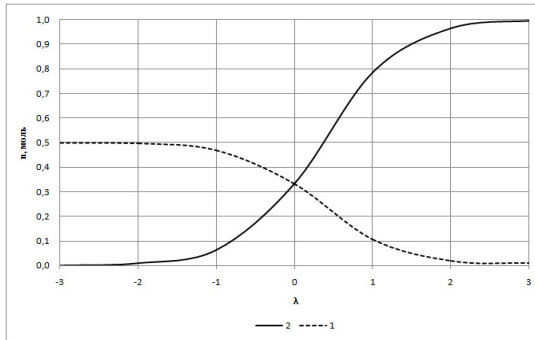


Figure 1. Dependence of the composition of the mixture for the reaction of formation and decomposition of HI on λ

SIGNATURES FOR FIGURES
DUBROVIN V. V. No. 2

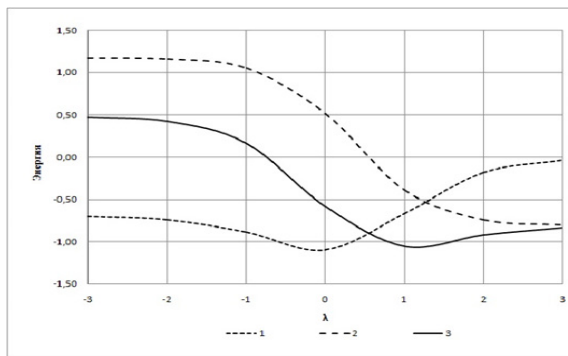


Figure 2. Dependence of mixing energy (1), additive energy (2), and Helmholtz free energy (3) for the reaction of formation and decomposition of HI on λ

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

2023 年 7 月 12 日。中国北京

编辑A. A. Siliverstova

校正A. I. 尼古拉耶夫

2023 年 7 月 12 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

