

Practice Oriented Science: UAE – RUSSIA – INDIA

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ARTIFICIAL INTELLIGENCE AS A PROJECT MANAGEMENT SPECIALIST'S TOOL IN THE CONTEXT OF THE NATIONAL PROJECT "DATA ECONOMY"

Polovova Tatyana Alexandrovna

Doctor of Economics, Professor

Moscow State University of Management of the Government of Moscow

Fedoseev Ivan Vladimirovich

Postgraduate student

Moscow State University of Management of the Government of Moscow

Annotation. *The report is an analytical study of the use of artificial intelligence as an effective tool in training and supporting project management specialists as qualified and competent personnel. In this report, the authors will consider the possibility of using artificial intelligence in the activities of a project management specialist, in particular, what are the pros and cons of using artificial intelligence in working with projects, what should be feared and what mistakes should not be made. Let's consider the possibilities of using AI in the work of future urban specialists. This report may be useful in further studying the implementation of national projects and analyzing existing results.*

Keywords: *Artificial intelligence (AI), project management specialist, project activities, AI as a tool, digital infrastructure.*

Introduction

During the plenary session of the Future Technologies Forum "Computing and Communications. Quantum World", Russian President Vladimir Vladimirovich Putin announced a new national project "Data Economy" [1], which will be aimed at the digital development of future specialists in Russia. The goal of this project is to transfer the economy and social sphere to a new qualitative level using new principles of work and interaction with the latest technologies. Using the example of the possibility of using AI in the activities of a project management specialist, we will consider how effective a tool AI can be in implementing the tasks of the national project "Data Economy".

AI technology is already being implemented in the professional activities of specialists in every area of the economy. Many corporations, government agencies

and legal entities are beginning to actively use AI technologies in their projects and regular work. The national project “Data Economy” is designed for implementation until 2030, and we do not yet know how far the technologies will advance, but already now it is possible and necessary to make certain conclusions and forecasts.

Research Methodology

The research method chosen was the analysis of the prospects for the use of AI in the professional activities of a project management specialist. Let’s consider what goals the national project “Data Economy” sets:

- **Data collection.** The main task is to develop the use of highly sensitive sensors, including quantum sensors. They are used not only in industry, but also in satellite and terrestrial communication systems, in medicine. For example, such sensors allow detecting diseases at the earliest stages.
- **Data transmission and development of communication systems.** Information must be transmitted in real time, without delays and at high speed. This is critical for the development of robotics, unmanned transport systems and automation of the urban environment.
- **Data storage.** This primarily concerns the development of domestic cloud platforms, data processing centers, and computing power of our own production. For example, computers using quantum and photonic technologies.
- **Data security.** It is necessary to continue working on quantum communications and quantum encryption technologies. They help to repel any cyber attacks, both classical and using quantum computers. Thanks to such technologies, the country’s security systems will be invulnerable to hacking.
- **Standards and protocols for working with data.** They are needed to ensure security, for reliable processing and storage of data. Especially in terms of storing personal data of citizens. Including using quantum cryptography technologies.
- **Data processing and analysis, open source repositories.** Data analysis algorithms should be based on artificial intelligence technologies. It is important that this work is carried out on the basis of Russian software. It is necessary to develop domestic platforms and services that are needed for the joint work of programmers from both Russia and other countries of the world.

The national project passport should be developed by the end of 2024, where the goals, objectives, expected results and methods for assessing the work performed will be officially regulated. We especially note the state’s interest in the development of IT startups and companies, which is a key indicator of the impor-

tance of developing AI technologies in Russia. Undoubtedly, it will be extremely useful for a specialist of the future to have skills in working with AI, since these technologies will increase the efficiency of activities many times over. Let us consider in more detail below how AI can act as a tool in the activities of a specialist when working with projects.

Let's start with the terminology to understand what the report is about. Artificial intelligence (AI) is a section of computer science that deals with solving cognitive problems usually intended for human intelligence, such as learning, problem solving, and pattern recognition. In modern realities, AI is assigned tasks mainly related to the processing of large amounts of data in order to extract the main information from the data or compile a specific sample on a topic of interest to us. While it is possible to understand what AI is, since many definitions have been given that are suitable for any area of human activity, it is still not clear who the specialist of the future is. Let's try to figure out who the project management specialist of the future is and how they differ from existing specialists. The specialist of the future is a professional who has modern knowledge and skills necessary for successful work in a rapidly changing world. This is a specialist who can quickly adapt to new technologies, has creativity and innovative thinking, is able to work in a team, quickly solve problems and make decisions. The specialist of the future is able to continuously learn, develop and follow trends in their field in order to be in demand in the labor market. AI is beginning to affect all human activity and the specialist of the future must be able to correctly and competently use these technologies as an auxiliary tool. Such skills are extremely important when working with projects, since projects always require clear and prompt actions in conditions of a lack of various resources.

The most active use of AI is already being carried out in such areas of activity as:

1. Data Analytics: AI can help a professional analyze large amounts of data, identify trends, predict results, and make informed decisions based on data;
2. Task automation: AI can be used to automate routine tasks, increasing productivity and freeing up time for more important and creative tasks;
3. Development and engineering: AI can assist a specialist in designing and creating new technologies, improving production processes and optimizing various systems;
4. Medicine: AI can be used to diagnose diseases, predict the course of diseases, develop personalized treatment plans and monitor the condition of patients;
5. Education: AI can help a specialist in accelerated and effective learning, personalization of the educational process, as well as in the creation of interactive and adaptive educational materials.

These are just some of the areas in which AI is useful for a project management specialist. In general, this technology can improve the efficiency, accuracy and in-

novation of a specialist's work in various fields of activity and in various projects. As we can see, AI is able to help a specialist of the future in implementing the national project "Economy of the Future" in each task, which allows us to assess the prospects for using AI in this area of activity. AI as a tool for collecting data and accumulating it into a single whole allows us to speed up the processes of the specialist of the future.

Research results

Let's analyze each goal of the national project "Data Economy" to see how AI can help in achieving these goals.

The first goal is data collection. This involves developing technologies in the field of sensors that allow monitoring of critical information. In order to use these technologies and properly control their work, it is necessary to develop the area of knowledge of specialists. AI can help simplify the process of collecting and sorting information that a specialist needs to monitor. With the help of AI, it is possible to significantly reduce the time for data analysis and quickly find important information. Using AI, it is possible to improve the sensors themselves in order to create self-regulating and self-analytical technologies based on AI.

The second goal is data transmission and development of communication systems. AI is a very useful tool that can help in development of robotics, unmanned transport systems and automation of the urban environment. AI is already helping IT specialists write programs that run unmanned transport systems and various robots [2]. A specialist of the future who will work in this industry will not be able to be truly effective without using AI in their work. Without this tool, a specialist of the future will not be competitive and not as effective as those who have mastered the technology of using AI.

The third goal is data storage. First of all, it is necessary to create a secure environment for data storage. In today's reality, this can only be done on domestic sites. The state is extremely interested in the promotion and development of AI technologies that can give a powerful leap in the creation of domestic software [3]. A specialist of the future in this field will be required to use AI as the most effective tool for the rapid and high-quality execution of tasks to create digital platforms for data storage. Here it is worth adding about data protection. Especially confidential data of citizens. If we set the goal of storing collected information, then we must provide guarantees that this data will be safe [4]. Although AI can help identify vectors of possible attacks on databases, it cannot be completely relied on. Specialists of the future must personally control data protection, not relying only on the capabilities of AI.

The next goal, namely standards and protocols for working with data, requires a specialist of the future to have deep knowledge of IT and programming. This knowledge is necessary to maintain confidentiality and security of data. Quantum cryptography is the science of encrypting data using methods based on the laws

of quantum mechanics. Unlike traditional cryptography, quantum encryption involves protecting and transmitting data using the physical properties of elementary particles [5]. Quantum cryptography involves the use of complex new technologies that are quite expensive and problematic to maintain. AI can relieve some of the burden on specialists in the field of generating cryptographic keys.

In the goal designated as - data processing and analysis, open source repositories, it is possible to directly connect with AI technologies and the programmers who use it. As has already been proven, AI is a useful tool in processing and analyzing large amounts of data. The ability to use AI in analysis should be in the hands of a specialist of the future who wants to be competent within the framework of the implementation of the national project “Data Economy”. If we consider the prospects for using open source repositories in this national project, it is necessary to note the interest of the Government of the Russian Federation. On October 12, 2022, the Government adopted a resolution “On conducting an experiment to grant the right to use programs for electronic computers, algorithms, databases and documentation for them, including the exclusive right to which belongs to the Russian Federation, under an open license and creating conditions for the use of open source software” [6], which outlines the goals and objectives for conducting an experiment in this area. This experiment will create a special ecosystem in the IT industry, which will allow specialists of the future to realize themselves in this project.

Conclusion

It is already clear that AI is an extremely promising tool, without which it will be difficult for specialists in many fields of activity to do in the future. AI will be especially useful in the field of IT, which already shows the interest of the Russian Government in this area. The IT field involves the presence of many projects that require special attention from specialists. If we consider the national project “Data Economy” specifically, then during its implementation it will be very useful to use AI in the work of most areas. AI will not be able to replace a competent specialist of the future, but it will be a useful tool in his activities.

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COMPARATIVE ANALYSIS OF APPROACHES TO DETERMINING THE DEFINITION OF “STATE - OWNED CORPORATION”

Polovova Tatyana Alexandrovna

Doctor of Economics, Professor

Moscow State University of Management of the Government of Moscow, Moscow, Russia

Topilskaya Arina Aleksandrovna

JSC NPK Tekhmash,

Postgraduate student

Moscow State University of Management of the Government of Moscow, Moscow, Russia

Annotation. *The current macroeconomic situation is subject to influence geopolitical situation and directly dependent on it, requires unprecedented measures in terms of allocation and distribution of financial resources. Private business is most dependent on market conditions (prices for materials and goods) and cannot quickly and promptly respond to the challenges of the global economy. Large development institutions that have all the necessary resources can smooth out the macroeconomic uncertainty that has arisen not only in the financial, but also in the social and other sectors of the economy.*

Keywords: *state corporations, financing, state enterprises, state capitalism, public sector.*

State corporations related to development institutions implement strategically important functions for the state (implementation of decrees of the President of the Russian Federation Federations associated with redistribution resources in terms of fulfilling state defense orders, leveling unemployment, supporting strategically important enterprises in terms of providing interest-free loans for the implementation of large projects, developing and maintaining single-industry towns, diversifying production and developing civilian production, etc.) [1]. It is state corporations that act as intermediaries between the state and business. State corporations are also participants in the budget process, and therefore are both recipients of budget funds and the main administrators of budget funds.

The financial and economic essence of state corporations in the Russian Federation consists of effective financial management within the framework of the

industry specifics of the state corporation (defense industry, nuclear energy, insurance, space industry, banking, tourism) [2]. For a more detailed definition of the financial and economic essence of a state corporation, it is necessary to define it as a definition from the point of view of a scientific approach and to give a qualitative assessment of the current definition from the point of view of its relevance.

Let us consider the experience of domestic and foreign scientists on the issue of defining the financial and economic essence of a state corporation.

Let us turn to the history of the issue of the emergence of state corporations that arose during the period of state capitalism. Based on the work of F. Engels, “The Development of Socialism from Utopia to Science,” It is obvious that the concept state capitalism was introduced in 1880, but later representatives of the domestic and foreign schools, including the Austrian school, widely used this definition to discuss the socialist economic system. F. Engels believed that state capitalism is the final stage of the development of capitalism as a whole [3].

It is worth noting that in the 1920s, practical experience of using state capitalism was in the USSR. V. I. Lenin developed state capitalism during the NEP years. Given the difficult economic situation that prevailed after the First World War and the Civil War, the NEP contributed to the restoration of the country’s national economy. V. I. Lenin believed that state capitalism is limited to the state and the control function is transferred to it [4,5]. This nature of the relationship between the state and business is the main criterion for defining state capitalism as a specific economic and political system [4,5].

L. Trotsky in his work defined state capitalism as “...management of a means of transport or an industrial enterprise” [6]. However, we do not agree with this opinion, since not only the above-mentioned spheres of activity can be under state control.

In 1936, the work of the Dutch scientist A. Pannekoek “State Capitalism and Dictatorship” was published, in which two approaches to the definition of “state capitalism” were given: the first defines it as an economic form in which the state acts as a capitalist employer, exploiting workers exclusively in the interests of the state, and the second defines it as a system controlled by the state [7]. It is important to note that the second approach assumes the existence of private enterprises, in contrast to the first approach, where the only corporation is the state itself.

In turn, representatives of the scientific Austrian school, such as M. Rothbard and L. von Mises, also considered the definition of “state capitalism”. M. Rothbard considered “state capitalism” as a system of relationships between business and the state, where the latter intervenes only in cases where the interests of consumers are violated [8]. In his work “Socialism: An Economic and Sociological Analysis” L. von Mises expressed the opinion that there are no significant differences between state capitalism, a planned economy and state socialism [9].

The author of the theory of “soft budget constraints” J. Kornai holds a different opinion. The essence of the theory is that the state creates a certain “protection” over business. This “protection” neutralizes the potential possibility of bankruptcy for the organization. The author of the theory expresses the opinion that the relationship between the state and business at different levels occurs through the exchange of services. The author calls such relations “indulgence” [10]. Of course, business operates in a market economy, but in fact under the control of the state. In turn, this weakens competition and is a determining factor of monopoly. In the modern economy, such a model of capitalism is called friendly or neighborly [10].

Having analyzed the approaches to the definition of “state capitalism”, we can conclude that several paradigms have emerged: the first considers state capitalism as a large production corporation that enslaves everyone, the second is a modern concept of interaction between the state sector and private business, the third is the accumulation of a pool of private enterprises in whose interest’s economic policy is carried out. Indeed, in its pure form, no single concept has ever existed or exists; in some countries there have been attempts to apply one or another approach, but most often it was a mixed type.

The above concepts in historical retrospect have acquired wide application only in two forms: the first and the second, since they presuppose the dominance of state capitalism in key sectors of the economy (for example, the military-industrial complex, the agro-industrial complex), directly owned by the state itself or under its control or connected to it in some other way. In this case, the model of J. Kornai is confirmed in practice.

However, our country was close to the very first concept, where the state is a large corporation. Thanks to the centralization of decisions taken at the tragic moment, the Great Patriotic War, as well as in the difficult post-war years. USSR, the country was able mobilized all its resources and quickly restored the economy.

It is a mistake to think that state corporations appeared in countries where the planned administrative economy prevailed or in countries with transitional economies, since the first nationalization of enterprises took place in the USA during the years of anti-crisis measures, as well as in the EU countries and, in modern times, during the global financial crisis of 2008-2009. It was at this time that the world-famous General Motors was nationalized by the US government. It is known that in a number of European countries: France, Italy, Spain, Portugal, the public sector plays a key role [11].

It should be noted that the functioning of a state corporation is impossible without regulatory bodies. For example, in the Schengen countries.

In Italy, there are such organizations as IRI (these are inter-industry state holdings in the industrial sector), ENI (fuel industry) and EFIM (manufacturing industry) [11, p. 60].

As for France, state corporations are represented in the aerospace industry (for example, Aérospatiale), mechanical engineering (for example, Renault), and also ferrous metallurgy [11, p. 61].

However, in Spain, the activities of state corporations are regulated by the National Institute of Industry (ENI), which is a state holding company that owns shares in industrial organizations. This holding company accounts for 7% of the country's industry [11, p. 61].

Let us consider the activities of state corporations in one of the countries of Southern Africa, namely Malawi. It is important to note the fact that the very approach to the definition of “state corporation” in the analyzed state is the opposite of the domestic one. For example, many state corporations exist in the form of limited liability companies: state corporations such as the National Economic Empowerment Fund (NEEF) and the Malawi Stock Exchange are limited liability companies and, therefore, do not have the right to declare dividends [12]. Also, state corporations of Malawi can be created through trusteeship: state enterprises such as the Smallholder Fertilizer Revolving Fund of Malawi (SFRFM), the Small and Medium Enterprise Development Institute (SMEDI), Press Trust, Central Medical Stores Trust and NITEL (formerly known as MALSWITCH) were created under Trustees Incorporation and, therefore, cannot declare dividends and their surplus cannot be transferred to the treasury [12].

It is important to note the fact that all state corporations and enterprises are under the jurisdiction of the Public Corporations and Government Investment Unit (PEGIU) of the Ministry of Finance of Malawi, which means that financing of all such enterprises is possible from the country's budget, which is unacceptable for the Russian approach.

In order to implement an effective budget policy in the country, a decision was made to privatize enterprises of the entire energy complex [13].

In general, the privatization policy that took place in the 1990s did not lead to the emergence of effective property, since the decline in economic growth and GDP was reduced by half compared to 1991, and in this regard, the government needed to apply a tougher state policy. Such intervention was quite an objective and justified step, since the elimination of market failures, the revival of those sectors of the economy that could potentially become a determining factor in the entire economy of the country, but given the fact that the enterprises were unprofitable and were on the verge of closing in the conditions of the international division of labor, they all turned into suppliers of raw materials. Focusing on raw materials served as the main factor for the creation of state corporations.

With regard to the domestic experience of state corporations, it should be noted that it is unique and modern.

If we look at history, state corporations in the Russian Federation are all relatively “young”, since they began their “existence” in the 2000s, and it was at this

point that a number of sectors of the economy began to be “state-owned”. First of all, such nationalization affected the oil industry, when the shares of the bankrupt OAO NK YUKOS were transferred to the state-controlled OAO NK Rosneft, and the shares of OAO Sibneft were sold to OAO Gazprom, subsequently transforming into OAO Gazprom Neft. As for aircraft manufacturing, in 2006 OAO United Aircraft Corporation (now PAO UAC) was formed, it was this organization that united all assets in the aircraft industry that the state had bought out from private shareholders. Then the shipbuilding industry underwent changes: all assets in this industry were transferred to OAO United Shipbuilding Corporation (now JSC USC). It is noteworthy that both of the above-mentioned industries are part of the State Corporation Rostec, that is, there has been a consolidation of both the holding structures and the structure of state corporations in Russia.

Thus, having analyzed various approaches to the definition of “state corporation” in both domestic and foreign literature, we can conclude that the difference itself lies in the source of financing of these state institutions. Also, one cannot fail to note one of the important aspects - a state corporation is a fundamentally new institution for our country, while in Western sources it is customary to consider, first of all, an organization whose goal is to maximize profits, and in Russian sources - it is a part of the state sector, which primarily provides and performs functions assigned to the state.

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TRENDS IN THE DEVELOPMENT OF DIGITALIZATION IN THE PUBLIC SECTOR OF THE RUSSIAN FEDERATION

Polovova Tatyana Alexandrovna

Doctor of Economics, Professor

Moscow State University of Management of the Government of Moscow

Ivanov Nikita Andreevich

Postgraduate student

Moscow State University of Management of the Government of Moscow

Abstract. *In this article discusses various approaches of the digitalization he public sector. Special attention is paid to the import substitution project and key information systems.*

Keywords: *IT, digitalization, government organization, import substitution, GosTech.*

Digitalization is a process that involves the transformation of an organization's business processes from an analog state to a digital format. The goal of digitalization is to increase the transparency of processes, achieve optimization to improve the quality of services provided, as well as maximize profits. As a result of digitalization, the quality of life of consumers of services increases, it becomes possible to control the internal processes of the organization, as well as make management decisions based on data from reports in real time.

According to the international research and consulting company Gartner, specializing in information technology, digitalization is the creation of a new business model using new digital technologies to generate revenue and create value. In other words, digitalization is a transition to a digital business [1]. The results of any digitalization can be divided into two large subcategories:

- Digitalization results by improving and optimizing existing business processes. Existing processes are trying to optimize, create more efficient business models, and reduce costs in various service delivery cycles.

- The results of digitalization by rethinking their activities. In this case, new products and services are released to the market to occupy a larger market share.

The strategy for the development of the Information Society in Russia for 2017-2030, approved by Decree of the President of the Russian Federation No.

203 dated 05/09/2017, gives the following definition: “The digital economy is an economic activity in which the key factor of production is data in digital form, processing large volumes and using analysis results, which, compared with traditional forms of activity, make it possible to significantly to increase the efficiency of various types of production, technologies, equipment, storage, sale, delivery of goods and services” [2].

The main goal of digitalization is a full-scale change in the business model using digital tools, which includes automation of business processes. In other words, it is the reengineering of the organization’s processes to achieve maximum usability both inside and outside the organization to eliminate duplicate processes within the same business process.

One of the most important areas of digitalization is public administration. The federal project on digitalization of public administration, the tasks of which are defined in the national goal “Digital Transformation”, which was signed by the President of the Russian Federation on July 21, 2020 No. 474 “On National Development Goals of the Russian Federation for the period up to 2030” [3]. The main objective of the program is to increase the share of socially significant services that can be obtained electronically to 95%. The main areas to be resolved by 2030 include:

- Transfer the provision of public services to electronic form;
- Increasing the use of the EPSU by the population to receive public services;
- Improving the speed and quality of public and municipal services for the public and businesses.

Digitalization at the state level of public administration has four main blocks: analog government, electronic government, digital government and the development of digital government – GOSTECH [4].

The first level, analog government, includes the characteristics inherent in a closed system:

- Closed structure
- Analog systems
- The state acts as a service provider

E—government is the use of information technology to automate work processes, improve the efficiency of data management, improve the quality of public services, and develop communication channels. Within the framework of e-government, there are three types of interaction: relations between state institutions (G2G); government-business relations (G2B) and government-citizen interaction (G2C). E-government has the following characteristics:

- The orientation of the state towards users
- Implementation of information systems
- Increased transparency of internal processes
- Many government processes use digital tools to provide services

Digital Government develops the concept of e-government, uses digitized data to proactively provide socially oriented public services. Among the key elements of the government's digital architecture are a unified state information portal, a system for joint data management from registries of various government agencies; provision of public services in a "single window" format. The differences between digital government and electronic government are that procedures are used that are developed taking into account digitalization-oriented processes and a digital approach to organizing activities and providing services to the public. There is a new method of providing a service, designated as GaaP, which means "The State as a digital platform." Internal processes are becoming more transparent and understandable for the public [4].

GosTech (GovTech) is a digital approach to the modernization of the public sector, which is able to improve the quality of public services, simplify interaction with civil society, and improve the efficiency of public administration. The concept of GOSTECH can mean a number of very different areas of activity: from the formation of a "smart" urban environment to the use of digital tools to combat crime [5].

The most significant government initiative in the realm of digital transformation is the migration of critical services to the GOSTECH platform. This platform was endorsed by the decree of the Russian government, issued on October 21st, 2022, under number 3102-r, titled "On Approval of the Concept for the Establishment and Operation of a Unified Digital Platform for the Russian Federation, GOSTECH," along with an action plan, or roadmap, for the development of this unified digital platform. The primary objective of this platform's evolution is to enhance the quality and accessibility of public services for both individuals and legal entities, while also aiming to expedite the commissioning of information systems for public service provision. The key drivers behind the establishment of this single digital platform include:

A long period of creation of state information systems. The average time to create a GIS is more than one year.

Inefficient use of current information systems. Many authorities have information systems with the same set of functions. An example of such a class of systems is electronic document management. According to the analytical center and the Tadviser portal, there are more than 10 major suppliers of this product on the Russian market [6]

- High costs for creating systems with similar functionality.
- Standardized methods for protecting information in the cloud.

The development of information systems within governmental organizations is often undertaken without considering the analogous functions of other entities. Many of the functions within systems of a similar nature overlap, and thus, once

a system is developed for one agency, it can potentially be repurposed by other departments, thereby avoiding the need for additional expenditure from the public purse. One of the primary objectives of the unified digital platform is precisely to facilitate the reutilization of functionalities across various systems. Additionally, it is frequently necessary to access data regarding individuals and legal entities maintained by third parties in order to ensure the smooth operation of governmental activities. These objectives can be achieved through the integration of diverse systems. In order for a system to be integrated onto the Guest platform, its development must adhere to the regulations and standards established by the platform. Detailed guidelines for the submission of digital products can be found on the website of the State Technical University.

In summarizing the outcomes of the digital transformation of public administration, it is possible to discern two primary tendencies:

- The first trend is the evolution of public administration itself, entailing a shift from traditional analog government to more sophisticated models such as electronic government (e-government) and digital government.
- The second major trend, stemming from the first, involves the establishment of a unified digital platform for citizens, followed by the migration of governmental information systems.

The foundation of digitalizing public processes lies in the reshaping of the approach towards managing public services and their delivery to the public. Through the integration of digital tools, public service provision is being elevated to a new level, enabling comprehensive monitoring of every step and enabling managers to make informed decisions based on data obtained from embedded information systems.

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STRATEGIC SUSTAINABILITY OF ENTERPRISES IN THE CONTEXT OF TECHNOLOGICAL TRANSFORMATIONS

Artyuhov Vadim Witalievich

Postgraduate student

*Federal State Unitary Enterprise “All-Russian Research
Institute “Center”*

Snakin Wiktor Walerevich

Postgraduate student

*Federal State Unitary Enterprise “All-Russian Research
Institute “Center”*

Ter-Akopov Vadim Gennadevich

Postgraduate student

*Federal State Unitary Enterprise “All-Russian Research
Institute “Center”*

Abstract. *The article identifies and characterizes scientific approaches to ensuring the sustainability of enterprises through the formation of an enterprise development strategy, the focus of which is the establishment of a long-term balanced and proportional economic activity through all production processes of economic entities, which allows for their optimal and effective implementation of their combined economic interests and the receipt of a synergistic effect.*

An approach has been developed to the formation (ensuring) of strategic sustainability of enterprises in the context of technological and organizational and economic transformations, which is a set of structural and logical connections between modern factors of influence, socio-economic transformations and determinants that ensure the strategic sustainability of enterprises. It is substantiated that the forms, content and nature of strategic sustainability are influenced by trends in the development of environmental factors.

The key elements of transformational changes in the format of strategic management of enterprises and ensuring the sustainability of their functioning and development are identified. The priority role of the relationship between strategic management and ensuring the sustainability of enterprises in the context of transformation processes in the economy is considered. Based on the study of theoretical and scientific-practical approaches to the transformation of business

and the economy of the country as a whole, scenarios for ensuring the strategic sustainability of enterprises are substantiated and designated.

Keywords: *strategic management, sustainability, scenarios of strategic sustainability, open innovations, strategic partnership.*

Introduction

A necessary condition for the implementation of transformations is ensuring the sustainability of economic entities. Studies of the theories of the evolutionary development of strategic management laid down by I. Ansoff, K. Prahalad, M. Porter, A. Chandler, and others show that throughout the various stages of development, the concept of strategic management became the subject of research by scientists at all levels of activity of economic entities and society as a whole.

Based on the analysis of scientific publications on the issues of strategic management and ensuring sustainability of both economic entities and the economy of the country as a whole, it was established that in economic science sustainability is considered as one of the concepts of the concept of economic equilibrium, the condition of which is the state of balance and proportionality of all production processes of an economic entity, namely: the balance of aggregate demand and supply. In addition, it should be noted that the majority of scientific approaches to the content of strategic management and sustainability highlight the need to obtain a synergistic effect as their main feature. It is this content of strategic sustainability that ensures the efficiency of enterprises.

The multifaceted and complex nature of the formation of strategic management and ensuring the sustainability of economic entities, the features and transformational changes in the economic space, modern trends in the development of various forms and methods of interaction between entrepreneurial structures, the transition to digital models of organization and business management - all this necessitates the development of a systematic approach to identifying key dominants and architectonics, the use of which will allow effective management of economic entities.

The purpose of the article is to develop an approach to the formation of strategic management and ensuring the sustainability of economic entities in the context of the transformation of the national economy. The principles of scientific research are highlighted as a theoretical and methodological base, which made it possible to study the theory and methodology of strategic management and sustainability of economic entities in modern conditions. In the course of the study, the following were used: a systemic-structural method in developing an approach to the formation of strategic sustainability of economic entities, as well as in determining the innovative component of strategic sustainability; a method of systems analysis in identifying factors influencing the strategic sustainability of economic entities in

the Russian Federation; a structural-logical method in developing scenarios for managing the sustainability strategy of enterprises.

Literature review

The authors' positions and conclusions are based on the most cited scientific articles and modern studies of Russian and foreign scientists on the problem of strategic management and its connection with the sustainability of economic entities. In particular, the essence of strategic management, its relationship with sustainability, structural elements and functions are presented on the basis of scientific works of researchers recognized by the scientific community, whose points of view and positions on the issues under study are presented in Table 1.

Table 1.
Views and points of view of economists on the issues under study

Research areas	Economists in relevant areas of research
Formation of the foundations of the theory and methodology of sustainable development of economic entities	I. Ansoff, R.I. Balashova, S.S. Golubev, I.V. Grechina, Yu.V. Gusev, D. Johnson, T. Dillick, K. Kenn, J. Quinn, J. Lawrence, M. Milstein, D. Norton, M. Porter, P. Root, L.N. Rudneva, A. Chandler, K. Funk, S. Hart, K. Hockerts, R. Steuer, K. Andrews, etc.
Approaches to defining strategic sustainability: - systems approach - marginal approach - process approach - market approach	M.N. Dudin N.S. Rychikhina; A.N. Ilchenko T.V. Terentyeva L.A. Danchenok, V.A. Kozlov, A.V. Kanunnikov et al.
Formation and development of integration processes in the economy, formation of new forms of organization of economic space	R. Ahrol, A.V. Buzgalin, R. Viber, S.A. Dyatlov, V.L. Inozemtsev, J. Johanson, M. Castells, K. Kelly, M. King, F. Kotler, S.I. Parinov, R. Paturel, V.M. Polterovich, M. Porter, J. Ruegg-Stuerm, H. Hakansson and others.
Production and commercial, information relations in complex economic systems, as well as integration forms of organization of economic activity	Yu.G. Lysenko, V.V. Dementyev, R.A. Rudensky, T.S. Klebanov, O.K. Eleseeva, A.O. Kolomytseva, V.N. Kravchenko, A.I. Chernyak et al.
Sustainability of economic entities	R.L. Akoff, V.V. Andreev, V. Bansala, A.A. Bloshenko, I.V. Bryantseva, T. Jenkins, A.V. Kanunnikov, N.V. Krasovskaya, T. Naylor, N. Nelson, C. Smithson, K. Taki, S. Hughes, etc.

Source: compiled by the authors

Despite a significant number of publications on the issue under study, there are still a number of insufficiently studied issues. In particular, individual issues of ensuring the economic sustainability of enterprises remain controversial, and a

number of aspects are insufficiently developed due to permanent changes in the external environment and require further scientific, theoretical, methodological and practical research. In particular, there are no methodological solutions for ensuring the economic sustainability of enterprises in modern conditions characterized by negative trends in economic sectors, as well as the blurring of interests of enterprises in the economic space, which predetermined the choice of the direction of this study. In this regard, it is necessary to develop a conceptual approach to solving the identified problems.

Research Methodology

The methodological and evidence base of the study are the principles and methods of system analysis, methods of comparisons and analogies. The basis for the study of problematic issues of strategic sustainability of enterprises is dialectical methods of cognition. From a methodological position, the study uses the tools of an objective study of modern trends in ensuring the sustainability of enterprises. The analysis of theoretical material and generalizations are carried out in the context of the approach to substantiating scenarios for ensuring the strategic sustainability of enterprises. Thus, the comprehensive and objective nature of the studied problems of the modern economy is ensured.

Generalization and substantiation of topical issues in terms of ways to ensure the strategic sustainability of enterprises during the period of economic transformation and theoretical aspects of the construction of methodological tools made it possible to carry out on the basis of the positions of domestic and foreign authors.

The hypothesis of the study is to identify the dependence of sustainability on strategic development scenarios. The purpose of the study is to develop a set of scientifically substantiated methodological provisions and recommendations for managing the strategic sustainability of enterprises due to changes in environmental factors.

Results and discussion

Currently, there are 4 main approaches to sustainable development: ecological-systemic, cluster, triune and sustainable development of business entities. At the same time, the foundations of the concept of sustainable development were laid in the works of E. R. Lindahl and D. R. Hicks [13; 16].

The presented results of studies of factors influencing the sustainability of business entities in modern conditions [8; 9; 14; 15], allows us to identify the main problems of maintaining sustainability:

- lack of or unclear formulation of the goals of enterprises and their strategy to ensure sustainability;
- weak control and monitoring of the financial condition, changes and trends in the economic space, including with respect to requirements for products/services (quality, innovation, values, etc.).

Meanwhile, the transformation of the economy determines new trends, strategic vectors of development of the environment of industrial enterprises. Practice shows that one of the problems on the way to achieving the set goal is the need to develop a theoretically sound strategy for the sustainability of enterprises. [13]. The importance of ensuring sustainability is due to the very development of economic entities, since it is aimed at "... creating a set of conditions and implementing targeted changes by management, the result of which is the growth of collective abilities to achieve the intended goals in changing external conditions" [7] and "is a balanced process of transformation, in which the use of resources, investments, social development and transformation of public institutions are aimed at the rational satisfaction of human needs and goals" [2, p. 5]. At the same time, Orekhova S.V. as the main feature of sustainable development of enterprises, he identifies "adaptability, duration of competitive advantages of the enterprise, consistency of current and future goals of the activity, consideration of the interests of all actors and society as a whole" [12, p. 19-20]. The established approaches to defining strategic sustainability are presented in a generalized form by Kuznetsova M.O. [10]. It seems that strategic sustainability of the enterprise as a system in the conditions of transformation means:

- the ability to self-preservation and reproduction, continuity of economic activity;
- reliability and adaptability;
- efficiency of resource potential implementation in the context of functioning and development;
- achievement of strategic goals;
- the ability to implement preventive measures of influence (through resource mobilization, optimization of structures, systems and processes, etc.) on threats and challenges of the external environment;
- the possibility of obtaining synergistic effects.

However, realizing the need to move to a new management concept, enterprises in their practical activities experience a lack of tools and methods in the field of ensuring sustainable development.

The objective need to overcome negative trends in the development of enterprises involves the development of strategies that ensure the sustainability of enterprises for the purpose of effective management in a competitive environment. Practice shows that a violation of the strategic sustainability of enterprises can lead to risks of financial losses as a result of reduced profits, market share, customer base and increased costs, etc.

In this aspect, the approach of Grigoriev S.V. deserves attention. [3], which emphasizes the need to develop requirements for the formation of a strategic sustainability management system and its life cycle processes based on the essence of the category "strategic sustainability" and the developed management method-

ology. In this regard, it is important not only to promptly identify threats, ensure adaptability to the impact of negative environmental factors and promptly identify and use opportunities, but also to mobilize and effectively use resource potential.

At the same time, classical concepts, methods and management tools do not provide an answer to a wide range of questions regarding the strategic sustainability of enterprises in modern conditions [1; 6; 8; 9; 11]. The transition to a new ideology of system-targeted sustainable development of enterprises is objectively necessary. This will update the task of developing and scientifically substantiating a modern theory of sustainable development of enterprises, the implementation of which is focused on generating competitive advantages, countering dynamically changing negative factors of both the external and internal environment.

As methods for ensuring sustainability, enterprises can use at least two approaches:

- based on modern and well-known technologies;

- based on new technologies and innovative solutions, as well as the effective implementation of the open innovation model through the development and application of appropriate innovation policies, including a partnership model of relationships between business entities [5].

T. Grossfeld, T. J. Rolandt rightly note that innovation policy should be aimed at activating and stimulating partnerships with the participation of innovation-active actors, such as research organizations, research and production firms, etc., which should be developed in the form of open eco-innovation systems [4].

These approaches can be implemented through scenarios for ensuring the strategic sustainability of enterprises, which can be considered as the following:

- the concept of strategic partnership of entrepreneurial structures;

- an integrated approach to the development of entrepreneurial structures based on strategic partnership (resource and competence base for the formation of strategic partnership of entrepreneurial structures, determination of determinants of partnership development, an approach to the formation of strategic partnership of entrepreneurial structures based on the principles of creating an ecosystem), ensuring sustainability and building adaptive business models capable of intensifying the long-term economic development of enterprises, as well as models for ensuring the sustainability of enterprises built on the basis of a lean approach, process, systemic and radical technological approaches;

- development of a market space model that allows for the formation of a strategy for ensuring the sustainability of enterprises;

- formation of scenarios for the economic development of enterprises that allow for the identification and forecasting of the main alternative parameters for ensuring their sustainability;

- development of a model for identifying and managing industry risks adapted to business;

- development of a resource management model that determines the type of resource investment strategy and its impact on the sustainable development of enterprises;

- creation of a technological platform as a mechanism for the sustainable development of ecosystems, which consists in considering ecosystems as co-evolving forms of economic activity in the context of changing technological paradigms through the synergetic interaction of object (clusters, technology parks, zones), structural (platform), process (network) and innovative (incubator, center) components.

These scenarios can be implemented by an enterprise either independently (on the platform of a new business model built in the context of the sustainable development paradigm), or by joining integrated structures and alliances with other enterprises.

The latter option is a consequence of the enterprise's desire to solve temporary production and innovation problems, including through access to new resources and technologies, which allows minimizing investments to eliminate problems, as well as obtaining additional competitive advantages. Ensuring strategic sustainability based on cooperation between business entities becomes relevant within the framework of the existing organizational form of enterprises in one industry or a group of interrelated industries, for example, according to the criterion of common production and sales or innovation interests, which will neutralize threats caused by international, technological, institutional and environmental problems. In this regard, a scheme for managing the strategic sustainability of enterprises (by integration levels) participating in integration projects is proposed (Figure 1).

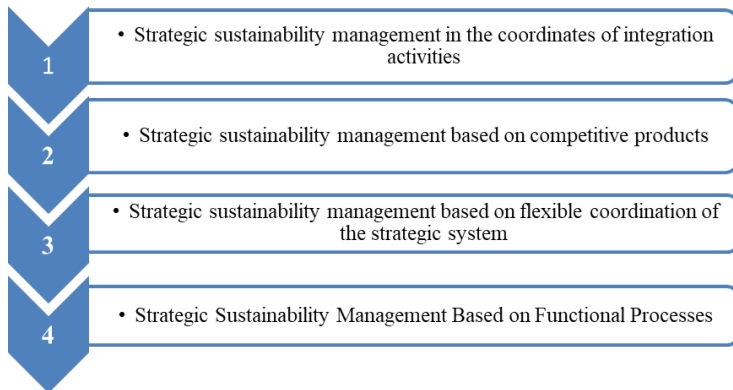


Figure 1. Scheme of strategic sustainability management of enterprises (by integration levels) participating in integration projects

Source: compiled by the authors

Within the framework of this variant of strategic management of enterprises, it becomes possible to most effectively use new and adapt existing methods and mechanisms of enterprise management, to solve problems of their transformation.

Thus, not only conditions are created, but at the same time there is a need for qualitatively new management structures and mechanisms that provide for increased coordination aimed at achieving interrelated economic, social, organizational and technological goals and effective problem solving at any of the enterprises. As a feature of the proposed integration, it is necessary to highlight the following:

- integration of enterprises is carried out within the framework of one industry or a group of interrelated industries, regardless of territorial location on the basis of common innovative and production interests (development and production of products, provision of other services);

- enterprises retain full legal and production-economic independence within the framework of contractual relations;

- the integrator enterprise or the innovator enterprise indirectly regulates the activities of the participants in the integration process.

Conclusion

The findings and results obtained can serve as a basis for further research in the field of integration activities of enterprises and assessment of their strategic sustainability. It is concluded that the strategies of enterprises in the long term are influenced by factors that are largely located in the external environment.

The authors defined scenarios of strategies for transforming business models for enterprises in the Russian market. The most successful are the strategies of adaptation of enterprises to external conditions, which allows, based on their own experience of participation in integration processes, to ensure sustainable development of enterprises.

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UNEMPLOYMENT IN THE RUSSIAN FEDERATION IN THE CONTEXT OF THE ECONOMIC CRISIS

Dzhafarov Navai Kamilovich

Lecturer

Moscow Aviation Institute (National Research Institute)

Annotation. *The article analyzes the state of the Russian labor market in the period from 2019 to 2023, examines its main macroeconomic indicators, calculates the unemployment rate by year and determines the factors influencing its change. In addition, conclusions are drawn about the peculiarities of unemployment in the Russian Federation, namely, the difficulties of forecasting its level, the realities of official data and geographical inequality in the unemployment rate.*

Keywords: *unemployment, unemployment rate, labor force, able-bodied population, working.*

One of the key problems of modern society is unemployment, which has a number of negative consequences. They include deterioration of people's living conditions, increase in poverty, decrease in the growth rate of gross domestic product, decrease in tax revenues, as well as increase in the socio-economic costs of the state and others.

As the unemployment rate increases, a certain proportion of the country's population faces difficulties in planning their future, getting an education and meeting basic needs. This further slows down economic growth, which should also be ensured by improving the quality of human resources.

The problem of increasing unemployment in Russia is currently taking on a special character in light of the country's grave economic situation and the adoption of economic sanctions by unfriendly states.

A comprehensive analysis of data in the area under consideration will identify trends and patterns, as well as factors that have the greatest impact on changes in the unemployment rate in the Russian Federation. Therefore, we will consider the employment indicators of the population of Russia in the period from 2019 to 2023.

Table 1
Key employment indicators in Russia from 2019 to 2023

Indicators	Years						
	2019	2020	2021	2022	2023 I quat.	2023 II quat.	2023 III quat.
Total population, thousand people	121 063	120 838	120 812	120 423	-	-	-
Labor force aged 15-72 years, thousand people	75 398	74 923	74 350	74 809	75 457	75 640	75 900
Employed, thousand people	71 933	70 601	71 719	72 016	72 789	72 922	73 289
Unemployed, thousand people	3 465	4 321	3 631	2 793	2 668	27 718	2 611
Persons not included in the labor force, thousand people	45 665	45 916	45 462	45 614	-	-	-

Table 1 shows that the total population has been decreasing throughout our study period. The same pattern is observed for the labor force, which decreases in 2019–2020, increases in 2021, and decreases again in 2022.

In 2021, the percentage of people in the labor force as a percentage of the total population was 52%. The number of people not in the labor force (that is, people aged 15 and over who are not employed or unemployed) increased by 0.6%, and the potential labor force by 9.1% over the period.

The slowdown in employment growth observed since 2019 continued in 2020. However, this trend has reversed since 2021, and employment growth has resumed and continued until the end of the third quarter of 2023.

By the end of 2020, all indicators of the labor market in Russia showed negative dynamics, which was associated with the COVID-19 coronavirus pandemic, which led to job cuts and the closure of many small and medium-sized businesses.

The average age of people looking for work (i.e. unemployed) in 2019 was 36.3 years, in 2020 - 36.6 years, in 2021 - 36.9 years, in 2022 - 37.8 years. As of the end of 2021, 33.7% of the total number of unemployed were young people aged 15 to 30, of which 3.6% were aged 15-19, 16.6% - 20-24 years, and 13.5% - 25-30 years. Based on the above data, we can calculate the unemployment rate for the study period from 2019 to 2023 using the following formula:

$$u = U/L * 100\%$$

where u is the unemployment rate, U is the total number of unemployed, L is the number of employed and unemployed citizens (labor force).

The calculated unemployment rate is shown in Figure 1.

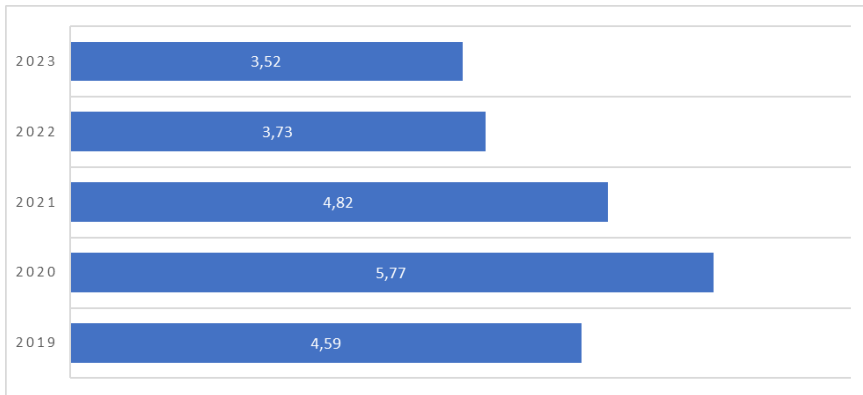


Figure 1. Unemployment rate from 2019 to 2023

The unemployment rate increased from 2019 to 2020, after which it decreased until the third quarter of 2023. Its maximum level was reached in 2020 and amounted to about 5.8%. This increase was primarily due to the increase in the retirement age and the increase in the number of people entering the labor market. Later, this indicator was affected by the COVID-19 coronavirus pandemic and the sanctions imposed by Western countries.

The minimum unemployment rate of 3.44% was recorded in the third quarter of 2023. The indicator increased by 1.18% from 2019 to 2020.

In the period 2020-2021, there was a decrease of 0.95%, and in 2021-2022 - by 1.09%. The unemployment rate in 2021 was 3.73%, and since 2022, there has been a decrease in this indicator.

In the first quarter of 2023, the number of unemployed people decreased to 2.7 million people, which is 600 thousand less than in 2022. In the second quarter of this year, the decrease was 0.2% compared to the first quarter, and in the third - 0.2% compared to the second quarter.

Based on the analysis, the following conclusions can be drawn:

1. One of the characteristics of unemployment in modern Russia is that its level is difficult to predict due to the influence of many factors, both internal and external;

2. Official data may underestimate the unemployment rate, this is due to the fact that many people do not register with employment services. This circumstance is especially relevant for young professionals, graduates of secondary and higher educational institutions, for whom it is more difficult to find a job due to the lack of experience and necessary skills;

3. There is geographic inequality in unemployment in Russia: in regions with developed industry and infrastructure, its level is lower than in remote and less

developed regions. This is explained by the uneven distribution of economic opportunities and resources between the regions of the country;

4. Factors influencing the change in the unemployment rate in the Russian Federation in the period from 2019 to 2023:

- the economic crisis, the introduction of sanctions against Russia by foreign states, as well as restrictive measures, such as self-isolation, border closures and others, caused by the COVID-19 coronavirus pandemic. All this led to the departure of foreign enterprises from the Russian market, their liquidation, and, accordingly, a decrease in the number of jobs;

- an increase in the retirement age for women and men (to 60 and 65 years, respectively), which led to an increase in the working-age population;

- an increase in the number of self-employed;

- creation of new jobs at enterprises producing import-substituting products, as well as in the military-industrial complex;

- implementation of measures to mobilize citizens, as well as the departure of the working population to serve under contract in the armed forces of the Russian Federation;

- reduction in the number of migrants caused by the fall in the ruble exchange rate.

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AUTOMATION OF PRODUCTION PROCESSES AND DATA PROCESSING METHODS IN TOURISM

Nazarov Husanbek Avazbek ugli

PhD student

Tashkent State University of Economics

ORCID ID:0009-0000-0898-3396

Abstract. *The rapid advancement of automation technologies and data processing methods is significantly transforming the tourism industry. This study explores the impact of robotic process automation (RPA), artificial intelligence (AI), and big data analytics on operational efficiency, cost reduction, and customer satisfaction within tourism enterprises. Quantitative data from 150 tourism businesses across four countries and qualitative insights from 20 industry stakeholders reveal that businesses implementing automation technologies experience a 35% increase in process speed and a 25% reduction in operational costs. However, the findings also highlight ethical concerns, particularly regarding job displacement and the loss of human-centered services. Furthermore, the integration of big data analytics has improved decision-making and service personalization, though challenges related to data privacy remain. The study concludes that while automation presents substantial operational benefits, businesses must adopt a balanced approach that incorporates workforce retraining, data security measures, and sustainable automation technologies to mitigate environmental impacts and ensure long-term industry growth.*

Keywords: *Automation, Tourism, Robotic Process Automation (RPA), Artificial Intelligence (AI), Big Data Analytics, Operational Efficiency, Customer Satisfaction, Job Displacement, Data Privacy, Sustainable Automation.*

Introduction

In the era of globalization and digital transformation, the tourism sector has become a vital contributor to the global economy, driving GDP growth, employment, and cultural exchange. In 2019, international tourist arrivals exceeded 1.5 billion, growing by 4%, highlighting the industry's expanding operations and the complexity of managing its processes and data. As tourism businesses face rising costs and demand for personalized experiences, automation and data-driven

strategies are essential for optimizing resources, streamlining workflows, and enhancing service delivery. Studies indicate that automation can boost productivity by 30-40%, particularly by reducing human involvement in repetitive tasks. The global travel data analytics market, valued at \$3.4 billion in 2020, is expected to reach \$8.9 billion by 2027, emphasizing the importance of data management. This article explores the critical role of automation and data processing in shaping the future of tourism management.

Literature Review

The intersection of automation and data processing in the tourism industry has gained considerable scholarly attention over the past two decades. A significant portion of the literature explores the evolution of tourism through technological innovations, particularly automation, and its subsequent impact on operational, economic, and social dimensions. Buhalis and Law (2018) provide an in-depth analysis of how digitalization has revolutionized the tourism sector, particularly by enabling seamless operational workflows through automated systems¹. Their study highlights that, through the use of automated booking platforms, customer service bots, and payment systems, tourism businesses can significantly reduce human error, lower costs, and improve customer experiences, thus fostering a competitive advantage in a highly dynamic market.

Similarly, Ivanov and Webster (2019) argue that the proliferation of robotic process automation (RPA) in tourism is not merely a technological trend but a strategic imperative for maintaining competitiveness². They note that robotic technologies, such as autonomous check-in systems and robotic room services, have become increasingly prevalent, especially in hotels and airports, leading to enhanced operational efficiency and an improved customer experience. Furthermore, their work delves into the implications of AI-driven tourism solutions, which provide personalization and predictive capabilities in line with evolving customer expectations. Nevertheless, Ivanov and Webster also underscore the complexities of human-robot interaction, especially in high-touch services like luxury tourism, where the human element is often crucial for customer satisfaction.

Murphy et al. (2020) expand on the discussion of automation's socio-economic impact, specifically emphasizing the displacement of labor and the growing necessity for workforce retraining. As tourism businesses adopt more automated systems, there is an increasing need for employees to upskill, particularly in areas related to AI management, data analytics, and machine learning³. Their research

¹ Buhalis, D., & Law, R. (2018). Progress in Information Technology and Tourism Management: 20 Years on and 10 Years after the Internet—The State of eTourism Research

² Ivanov, S., & Webster, C. (2019). **Robots in Tourism and Hospitality: A Research Agenda**. *Annals of Tourism Research*, 74, 440-442. <https://doi.org/10.1016/j.annals.2018.07.005>

³ Murphy, K., Gretzel, U., & Pesonen, J. (2020). Robots in Hospitality and Tourism: A Research Agenda. *Journal of Hospitality and Tourism Management*, 44, 119-123. <https://doi.org/10.1016/j.jhtm.2020.04.005>

identifies a dual effect: while automation can enhance productivity and reduce costs, it also poses challenges related to employment and human capital management. In this context, Smith and Chen (2021) call for a balanced approach to automation, where human expertise is combined with technology to create hybrid service models, ensuring that the unique value of human interaction is not lost in the drive for efficiency.

In addition to automation, big data analytics has emerged as a transformative force in tourism. Gretzel et al. (2021) argue that the increasing availability of travel-related data from various digital platforms has enabled tourism businesses to analyze patterns, predict consumer behavior, and optimize their services⁴. Their work focuses on how data processing methods—ranging from basic data mining to advanced machine learning algorithms—allow for real-time insights into customer preferences, thereby enhancing strategic decision-making. They contend that the ability to process and interpret large datasets is vital for creating personalized travel experiences, improving marketing strategies, and forecasting future trends in tourism demand.

Moreover, Li, Xu, and Tang (2020) stress the importance of integrating automation with big data analytics to create intelligent systems capable of self-learning and continuous improvement. They propose a model where automation not only streamlines routine processes but also feeds data into predictive analytics platforms, creating a feedback loop that continuously refines service delivery. Their findings suggest that the combination of these technologies could lead to a more customer-centric tourism ecosystem, where services are tailored to individual needs in real time⁵.

However, the literature also reveals significant ethical and sustainability concerns related to the adoption of automation in tourism. Dabas and Kothari (2019) raise important questions regarding the potential for widespread job displacement and the long-term sustainability of an overly automated service model. They argue that while automation can improve efficiency, it may also detract from the personal touch that is often a hallmark of high-quality tourism services. Furthermore, they caution against the environmental impact of automation technologies, such as increased energy consumption from AI-powered systems, calling for a more balanced and responsible approach to technological adoption.

Finally, Zhang et al. (2022) explore the role of sustainable automation in tourism, focusing on how environmentally friendly technologies can be integrated into

⁴ Gretzel, U., Li, X., & Fesenmaier, D. R. (2021). Big Data and Analytics in Tourism: Management, Implications, and Research Directions. *Journal of Travel Research*, 60(5), 1044-1062. <https://doi.org/10.1177/0047287520947815>

⁵ Li, Y., Xu, X., & Tang, H. (2020). The Impact of Big Data Analytics on Business Performance: The Tourism Sector. *Journal of Business Research*, 116, 114-123. <https://doi.org/10.1016/j.jbusres.2020.05.022>

automated systems to reduce the carbon footprint of tourism operations. Their research highlights innovations such as automated energy management systems in hotels, which optimize energy usage based on real-time data, contributing to both cost savings and environmental sustainability. This reflects a growing recognition within the literature that the future of tourism must not only be technologically advanced but also environmentally conscious.

In summary, the literature underscores the profound implications of automation and data processing for the tourism sector. While automation promises significant gains in efficiency and customer satisfaction, its successful implementation requires careful consideration of human factors, ethical implications, and sustainability challenges. The integration of big data analytics further enhances the value of automation, enabling tourism businesses to remain agile and responsive to market changes.

Methodology

This study uses a mixed-methods research design to investigate the automation of production processes and data processing methods in the tourism industry. A combination of quantitative and qualitative approaches was used to ensure comprehensive analysis, integrating empirical data with theoretical frameworks. The quantitative component involved data collection from 150 tourism businesses, including hotels, travel agencies, and online booking platforms, across four countries. A structured survey assessed the impact of automation on labor costs, process speed, and customer satisfaction. Data were analyzed using SPSS software, employing descriptive statistics and regression analysis to identify key trends.

The qualitative component explored human and managerial perspectives on automation through semi-structured interviews with 20 key stakeholders. Thematic analysis was applied to identify recurring themes, such as operational efficiency, human-robot interaction, and ethical concerns. NVivo software was used to systematically code the interview data.

Additionally, five case studies of tourism businesses, such as Booking.com and Hilton Hotels, were conducted to examine the practical application of automation technologies, focusing on robotic process automation (RPA), artificial intelligence (AI), and big data analytics. Document analysis of reports and case studies provided further insights. Data triangulation was employed to enhance the credibility of findings by integrating survey, interview, and case study results.

Results

The analysis of the data collected through surveys, interviews, and case studies reveals several key trends in the automation of production processes and data processing methods in the tourism industry. The findings are presented below through a combination of quantitative results and qualitative insights, supported by tables, charts, and diagrams for clarity.

1. Impact of Automation on Operational Efficiency-The survey results show a significant correlation between the level of automation and operational efficiency across the sampled tourism businesses. A regression analysis of the data reveals that businesses that have adopted automation technologies, such as robotic check-in systems and AI-powered customer service platforms, report a **35% increase** in process speed and a **25% reduction** in operational costs.

Table 1.
Impact of automation on key performance indicators (kpis)

KPI	Pre-Automation (Average)	Post-Automation (Average)	Percentage Change
Process Speed (in minutes)	45	29	-35%
Operational Costs (per year)	\$200,000	\$150,000	-25%
Customer Satisfaction Score	7.2/10	8.5/10	+18%
Employee Workload (hours/week)	40	28	-30%

The table illustrates the improvements in process efficiency, cost savings, and customer satisfaction resulting from the implementation of automation technologies. The most notable change is the **30% decrease** in employee workload, highlighting the significant reduction in manual, repetitive tasks.

2. Adoption of big data analytics in decision-making-The use of big data analytics has emerged as a critical tool for personalizing customer services and optimizing business operations. As shown in **Figure 1**, **65%** of tourism businesses in the sample report using data analytics for customer segmentation, while **45%** use predictive analytics to anticipate future travel trends.

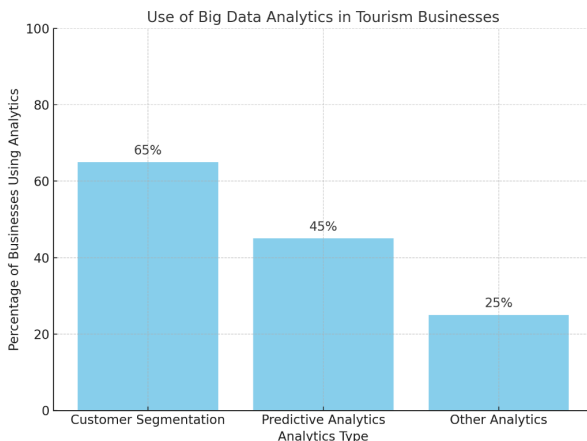


Figure 1. Use of big data analytics in tourism businesses

This chart shows the widespread adoption of customer segmentation and predictive analytics in the tourism sector. The data suggest that businesses leveraging data analytics report a **20% increase** in targeted marketing effectiveness and a **15% growth** in customer retention.

3. Ethical and managerial challenges of automation-The qualitative data gathered through interviews reveal several concerns regarding the human and ethical implications of automation. One recurring theme is the **potential displacement of workers**, as mentioned by **80%** of respondents, particularly in roles traditionally filled by human staff such as receptionists and concierges.

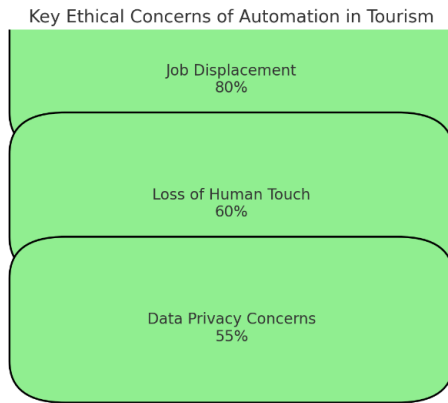


Diagram 1. Key ethical concerns of automation in tourism

This diagram outlines the primary ethical concerns identified by stakeholders, including job displacement, the loss of the ‘human touch’ in customer interactions, and concerns over data privacy. These findings suggest that while automation brings operational benefits, it also necessitates careful management to address these challenges.

4. Case study findings-The case study analysis of five tourism businesses further reinforces the quantitative findings. For instance, **Hilton Hotels** reported a **40% reduction** in check-in times after implementing an automated check-in system, while **Booking.com** saw a **25% increase** in customer satisfaction through AI-driven customer support solutions.

Case study table:

Automation results across selected tourism businesses

Business	Automation Type	Key Benefits
Hilton Hotels	Automated Check-in System	40% reduction in check-in time

Business	Automation Type	Key Benefits
Booking.com	AI-Driven Customer Support	25% increase in customer satisfaction
Plaza Hotel	Robotic Room Service	20% reduction in labor costs
Expedia	Data-Driven Marketing	30% improvement in targeted marketing
Airbnb	Automated Property Listings	50% increase in property management speed

This table summarizes the automation technologies implemented in these businesses and the corresponding operational improvements. It highlights the versatility and scalability of automation across various functions within the tourism sector.

5. Overall industry trends-Finally, the overall trends indicate that the adoption of automation and data processing methods in tourism is set to continue growing. **Figure 2** shows the projected increase in the use of automation technologies in the next five years, with an expected **70% adoption rate** by 2030.

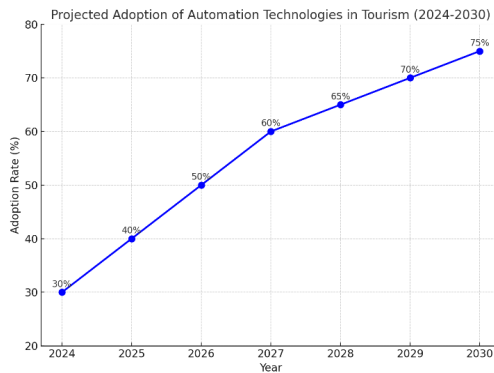


Figure 2. Projected adoption of automation technologies in tourism (2024-2030)

This projection, based on industry surveys and expert interviews, suggests that automation will play an increasingly pivotal role in shaping the future of tourism, driven by advancements in AI, robotics, and big data analytics.

Conclusion

The integration of automation technologies and data processing is transforming the tourism industry, significantly improving operational efficiency, reducing costs, and enhancing customer satisfaction. This study shows that businesses using robotic process automation (RPA), artificial intelligence (AI), and big data analytics achieve a 35% increase in process speed and a 25% reduction in costs. However, the automation of customer-facing roles raises concerns about job displacement, particularly in low-skill positions. A balanced approach, combining

automation with workforce retraining, is needed. Additionally, while big data analytics improves decision-making and customer retention, issues of data privacy must be addressed through strong regulatory frameworks. The environmental impact of automation technologies also calls for adopting energy-efficient, sustainable solutions. Ultimately, the future of automation in tourism will depend on businesses finding a balance between technological progress, ethical considerations, and sustainability goals.

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THE POSITION OF SMART CONTRACT IN THE CIVIL LAW OF THE RUSSIAN FEDERATION AND THE PROSPECT OF ITS DEVELOPMENT AS AN INDEPENDENT TYPE OF CONTRACT

Pushilina Ekaterina Eduardovna

Postgraduate student

Academy of Law and National Security,

Southern University “Institute of Business and Law Management”

Abstract. *The subject of the study is the place of smart contract in the national civil law. Consideration of the possibility of integrating the smart contract into civil law as an independent type of contract.*

Keywords: *smart-contract, law, civil law, legal regulation of smart-contracts, concept of smart-contracts, place of smart-contracts in Russian law, form of smart-contract as a contract.*

Smart contract is a completely new type of contract for Russian law, its peculiarity as a contract is determined by its origin and method of conclusion. The smart contract is regulated not only by traditional contract and obligation law, but also by technical program code, therefore not only traditional general rules of transaction conclusion, but also technical instructions of code development are applied to it, thus, the smart contract is a new and promising form of transaction, in which there must be an unambiguous agreement between the parties on all essential terms of the contract. Promising form of transaction, in which there should be an unambiguous agreement by the parties of all the essential terms of the contract, encoded in the program code, which automatically checks and fulfills these conditions, which also represents a new promising way of ensuring the fulfillment of obligations [7].

At the moment the definition of a smart contract is given only in the draft Federal Law “On Digital Financial Assets” according to which a smart contract is an agreement in electronic form, the fulfillment of rights and obligations under which is carried out through the automatic execution of digital transactions in a distributed register of digital transactions in a strictly defined sequence and at the occurrence of circumstances defined by him [3]. The above definition refers to the smart contract as a contract concluded in the form of an electronic document, which in turn extends to it the provisions on civil law contracts.

However, some features of a smart contract do not allow for the full application of the totality of the norms governing the types of contracts enshrined in civil law.

One of such features is the form of the contract. According to Article 434 of the Civil Code of the Russian Federation, a contract may be concluded in any form provided for transactions, if the law does not establish a certain form for contracts of this type. A contract in writing may be concluded by drawing up a single document (including electronic) signed by the parties, or exchange of letters, telegrams, electronic documents or other data in accordance with the rules of this Code [1]. Thus, the current civil law presents an electronic document as a single document that includes the main terms of the contract, drawn up in electronic form.

A smart contract is a program code, which sets out the terms and conditions and a clear sequence of actions when the parties comply and fail to comply with their obligations. A program code cannot be a document for several reasons:

- First, because it is drawn up in a programming language, while it is clear from the interpretation of the procedural legislation that the document must be drawn up in Russian or in the language or state language of the republic which is part of the Russian Federation and on whose territory the relevant court is located,

- Secondly, a smart contract does not contain the terms of the agreement on the establishment, termination and change of civil rights, it fixes only the order of actions of the parties to implement the terms of the agreement.

Civil law also defines the written form of a transaction, which is considered to be complied with also in case a person makes a transaction with the help of electronic or other technical means that allow to reproduce on a tangible medium in an unaltered form the content of the transaction, and the requirement for a signature is considered to be met if any method is used that allows to reliably determine the person who expressed the will. The law, other legal acts and the agreement of the parties may provide for a special method of reliable determination of the person who expressed the will [1].

Consequently, in order to apply to a smart contract the provisions of civil law regarding the written form of the transaction it is necessary to be able to transfer the program code to a tangible medium without changing its content.

The complexity of placing the terms of a smart contract on paper or in the form of an ordinary agreement is that it works on the basis of blockchain, in which the data of the parties are hidden, and only information regarding the terms and performance of the contract is public, in other words, the blockchain has the ability to record reliable data on the belonging of a digitally existing asset to a certain person without the need to engage any specialized intermediary [4].

The possibility of obtaining and reflecting the data of the parties who have entered into a smart contract within the documents of title is also one of the key factors in the integration of smart contracts into civil law.

The analysis of the provisions of the civil law suggests the ability to include the smart contract in its structure. The norms of civil law to date do not fully provide the possibility of using and realizing the protection of rights in the electronic environment, at the same time we can talk about the necessary degree of broad interpretation of the terms of the smart contract, which will allow to determine and implement the will of the parties, which in turn can be regarded as the terms of the contract.

This approach will allow to fully protect the rights of the parties to the smart contract, giving them the opportunity to protect their rights in the courts in the future. The same position is enshrined in the draft Federal Law “On Digital Financial Assets”, which indicates that the protection of the rights of participants (parties) of a smart contract is carried out in a manner similar to the procedure for protecting the rights of parties to an agreement concluded in electronic form [3].

It should be noted that the spread of the use of smart contract as an independent contract will grow along with the increasing level of digitalization of society, and as a consequence, civil law will be forced to include a smart contract in the contract.

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THE PROBLEM OF RESPONSIBILITY FOR ILLEGAL EXTRACTION (CATCH) OF AQUATIC BIOLOGICAL RESOURCES ON THE EXAMPLE OF THE FAR EASTERN REGION

Ageev Ernest Gennadievich

Postgraduate student

Kazan (Volga region) Federal University

***Annotation.** Due to the negative impact of man on the environment, at the present stage of development of civilization, most countries of the world pay close attention to the issues of responsibility for illegal extraction (fishing) of aquatic biological resources. In the presented article the question of public danger of illegal extraction (catch) of water biological resources is considered and the analysis of responsibility for this crime with concretization of a subject of encroachment, namely catch of the Kamchatka crab and taking into account practice of Kamchatka and Sakhalin is carried out.*

***Keywords:** Criminal liability, ecological crimes, water biological resources, environmental protection, ecological safety.*

The field of ecology is considered the most significant among the objects of criminal law protection; procedures for legislation on the part of public relations, form the legislative base, the practice of law enforcement, and lead to active work with relevant international organizations. If these problems are more local in the Russian regions, then for the far Eastern region, the foreign orientation of this crime is noted as the main feature, which indicates an increased public danger of these encroachments; this circumstance makes it difficult to objectively assess the harm caused by these crimes, causing objective difficulties in combating them. Preventing damage caused by environmental crimes of a transboundary nature, developing methods for its objective statistics, identifying its scale, and evaluating it would make an invaluable contribution to the preservation of ecosystems of individual States and the natural environment on a global scale, since experts note the threatening scale of negative anthropogenic impact on it¹.

From 1997 to 2016, the following number of crimes under article 256 of the criminal code of the Russian Federation were registered (see table 1):

¹ See: Kuzmenko E. Yu. Institute for environmental impact assessment in international environmental law: autoref. Diss. ... doctor of law. - Kazan, 2019. - P. 6.

As can be seen from the above data, illegal extraction (fishing) of aquatic biological resources is one of the most common environmental crimes[1, p.104].

The subject of the crime is water biological resources. When describing this feature of the crime, the legislator used a generic concept, its content is disclosed in Federal law No. 166-FZ of December 20, 2004 “on fishing and conservation of aquatic biological resources” [2, article 1]. aquatic biological resources include fish, aquatic invertebrates, aquatic mammals, algae, and other aquatic animals and plants that are in a state of natural freedom. Otherwise:

1) aquatic animals – marine mammals (walruses, seals, sea lions, sea lions, dolphins, etc.), crustaceans (crayfish, crabs, shrimps, etc.), mollusks (squids, octopuses, scallops, mussels, oysters, etc.), echinoderms (trepangs, sea urchins, starfish, ophiurians, holothurians, etc.), intestinal-cavity aquatic organisms;

2) commercial marine plants – aquatic plants capable of autotrophic nutrition, i.e., the synthesis of all necessary organic substances from inorganic ones, which are commercial in a certain place and at a certain period of time, which is established by national legislation or international legal acts, or have a special legal status (for example, the so – called sea cabbage-kelp) [1, p.105].

The problem of illegal hunting and illegal extraction (catch) of aquatic biological resources has been familiar to Kamchatka and Sakhalin since the 90s.[3]. The subject of crimes related to the illegal extraction (fishing) of aquatic biological resources on the island and Peninsula of Russia is primarily the Kamchatka crab.

Kamchatka crab is considered a delicacy in South Korea, Japan and the United States of America. The demand for this Russian product is quite high. However, the export of Kamchatka crab outside the Russian Federation is not easy; the procedure for its export is limited by legal requirements. In the previous version of the fishing Rules for the far Eastern fisheries basin, it was prohibited to transport live, fresh and chilled crabs obtained in the territorial sea, economic zone and on the continental shelf, as well as in the internal sea waters of the Russian Federation outside the exclusive economic zone of Russia. The catches themselves had to be delivered for processing or sale only to Russian enterprises. The new version of clause 16 implies the legal possibility of exporting this product, but only after the catch is delivered to the customs territory of the Russian Federation.

However, this did not change the situation. Illegal extraction (fishing) of aquatic biological resources continues to gain momentum. The reason is that the generally allowed catch of crabs would bring poachers less profit than they received in violation of the law. A. A. Savelyev, who was in 2010 the head of the center for public relations of the Federal Agency for fisheries of the Russian Federation, in an interview[3] indicated that in 2009 the generally allowed catch of crab was just over 50 thousand tons. Referring to Korean, Japanese and American sources, he also noted that there were 103,300 tons of the product abroad. The estimated profit

of poachers, according to Savelyev, for 100 tons of product is equal to 1 million dollars. These figures have increased significantly in recent years. The total allowable catch of Kamchatka crab in 2017 is approximately 70 thousand tons. This is 2 thousand crab-fishing vessels. And even with the increase in the number of allowed, the situation does not change. The total revenue from crabs is 145 billion rubles a year. For reference, it should be noted that the cost of the product in the ports of Japan and South Korea is \$ 32 per 1 kg.

Arkady Gontmacher, known as the President of the once-existing company Global Fishing Inc, after accusing him of illegally acquiring Kamchatka crab, claimed that he bought this product exclusively in Busan, in the port of South Korea. He explained his activities by the fact that it was impossible to trace the purchase of quotas, sale and resale of goods. This was possible only with black caviar, but there was no corresponding inventory for such a position as Kamchatka crab.

Such shortcomings in the regulation of the sale of Kamchatka crab untie the hands of many entrepreneurs in the field of fraud with the extraction of Kamchatka crab.

According to Russian legislation, the Kamchatka crab is considered as an aquatic biological resource[2].

It should be noted that the current version of the Criminal Code of the Russian Federation does not contain a General article on poaching. This environmental crime involves different criminal liability, depending on where and how it was committed. Thus, the extraction (catch) of natural resources of the continental shelf of the Russian Federation or the exclusive economic zone of the Russian Federation, carried out without the necessary license (quota), implies liability under part 2 of article 253 of the criminal code of the Russian Federation, and not under art. 256 of the criminal code of the Russian Federation [4] (Illegal extraction (catch) of aquatic biological resources).

On the objective side, the crime under consideration is expressed in illegal extraction (catching) water biological resources specified in article 256 of the criminal code of the Russian Federation. Illegal mining should be considered if it is performed in violation of the rules established by regulatory legal acts. Due to the blank nature of the rule in question, to determine the nature of the violated rule, it is necessary to refer to the legislative norms that establish these rules. They may be Federal in nature, relate to a particular region, or operate on the territory of a subject of the Russian Federation [1, 105-106c.].

Another characteristic feature of the crimes under consideration is that they are committed within certain territories. In relation to the far Eastern region, it is necessary to define the boundaries of the continental shelf and the exclusive economic zone. “The continental shelf of the Russian Federation includes the seabed and subsoil of underwater areas located outside the territorial sea of the Russian

Federation throughout the natural extension of its land territory to the outer border of the underwater margin of the continent. The underwater margin of the continent is a continuation of the continental massif of the Russian Federation, which includes the surface and subsurface of the continental shelf, slope and rise”[5]. “Exclusive economic zone of the Russian Federation — a sea area located outside the territorial sea of the Russian Federation and adjacent to it, with a special legal regime established by this Federal law, international treaties of the Russian Federation and international law” [6].

Under illegal extraction (catch) of aquatic biological resources (article 256 of the criminal code) [4] refers to “actions aimed at their removal from the environment and (or) taking them in violation of environmental laws (such as obtained in accordance with the law permits, in violation of the provisions of this resolution, in prohibited areas in respect of certain types prohibited for the extraction (catch) of aquatic biological resources, prohibited time, using illegal fishing gear), provided, that such actions were committed by a person using a self-propelled floating transport vehicle, explosives or chemicals, electric current or other prohibited tools and methods of mass destruction of aquatic biological resources, in spawning areas or on migration routes to them, in specially protected natural territories, in an environmental disaster zone or in an environmental emergency zone, or when such actions caused major damage” [7].

Fishing of aquatic biological resources within the continental shelf or exclusive economic zone without a special permit is fully covered by part 2 of article 253 of the criminal code of the Russian Federation [4]. Exceptions are those acts that have the characteristics provided for in parts 1 and 3 of article 256 of the criminal code. This is noted In the resolution of the Plenum of the Supreme Court of the Russian Federation No. 26 of 23.11.2010 (ed. 31.10.2017) “on certain issues of application by the court of legislation on criminal liability in the field of fishing and conservation of aquatic biological resources (part 2 of article 253, articles 256, 258.1 of the Criminal Code of the Russian Federation).

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COOPERATION BETWEEN THE RUSSIAN FEDERATION AND THE UAE SINCE THE SECOND DECADE OF THE XXI CENTURY

Kolycheva Sabina Konstantinovna

Postgraduate student

Belgorod State University

Uryvsky Andrey Petrovich

PhD in Historical sciences, Associate Professor

Belgorod State University

Abstract. *The article examines the conceptual foundations of relations between Russia and the UAE in the second decade of the XXI century. In addition, an analysis of topical issues in interstate relations is provided, including the role of the Emirates in the BRICS at the present stage.*

Keywords: *Russian Federation, UAE, BRICS, economic cooperation, regulatory framework.*

In the period of transformation of the international system and the growing number of non-governmental organizations, the development of bilateral relations between States is becoming important. For the Russian Federation, strengthening cooperation with the countries of the Middle East, and therefore the United Arab Emirates, as a state whose economic resources are increasing every year with the possibility of entering world markets through the export and import of the same educational services, the development of cultural and political dialogue contributed to cooperation with the Russian Federation for the long term.

It should be noted that since 1971, diplomatic relations between Russia and the UAE have moved into an active phase of cooperation at the political level, followed by the opening of embassies, starting in 1986 (the Russian Embassy in Abu Dhabi) and in 1987 - the Embassy of the United Arab Emirates in Moscow. In addition, with the collapse of the bipolar system, which was carried away by the existence of the USSR as such, the question arose of recognizing the Russian Federation as a successor, the status of which the UAE also supported. Since January 1991, the states have signed a number of agreements, including on trade, economic and technical cooperation, which only strengthened the relations of the countries and brought them to a new level [1].

In the future, the interstate dialogue developed due to an increase in the number of mutual visits of states, in this case it should be noted that in 2007, the first visit of Russian President Vladimir Putin to the Emirates in the history of cooperation between the countries took place, within the framework of which a number of important documents regulating Russian-Emirati relations were signed:

1) In 2007: intergovernmental agreements on cooperation in the field of combating crime, along with the growth of terrorist groups; on the settlement of debts of the former USSR; Memorandum of Understanding on consultations between the Ministry of Foreign Affairs of the Russian Federation and the Ministry of Foreign Affairs of the UAE, etc.

2) In 2011-2014: agreements on taxation of income from investments; on the peaceful use of atomic energy; Memoranda on the development of cooperation between the Ministries of Economy of the states; on mutual understanding between the Ministry of Education and Science of the Russian Federation and the Ministry of Higher Education and Scientific Research of the UAE [2].

As it can be noted, the number of Russian-Emirati regulatory documents has increased significantly every year, thereby predicting the strengthening of relations and the transition to the level of strategic partnership, which happened with the signing of the 2018 Declaration. According to the document, the parties pledged to increase the number of visits of heads of state to each other's countries, as well as to hold regular consultations of the Ministries of foreign Affairs, including discussing issues that are being considered within the framework of the UN and other international organizations, for example, BRICS. In addition, Russia and the UAE agreed to develop cooperation through other areas of interaction, in particular, on renewable energy sources, the industrial sector of the economy, transport and, undoubtedly, in the field of improving information policy and technology. Cultural, humanitarian and educational cooperation has also become an important part of Russian-Emirati relations, as the states noted their interest in developing each other's scientific potential, the interaction of various organizations (museums, academies of sciences, research centers, etc.), as well as the organization of exchange programs for students, etc. [3]

Consequently, based on such an extensive number of documents of the regulatory framework, it can be concluded that by the end of the second decade of the XXI century, states were increasing cooperation at both the political, economic and cultural levels, as well as the mutual abolition of the visa regime for citizens contributed to strengthening relations.

However, with the spread of the Covid-19 pandemic, communication and personal meetings between representatives of states sharply decreased due to the restrictions imposed, but this did not affect the increase in political and economic dialogue between states, as there was an active increase in trade turnover between

the countries, which was discussed at the first meeting after Covid, UAE Foreign Minister Abdullah bin Zayed Al Nahyan and the head of the Russian Foreign Ministry Sergey Lavrov. In particular, the reorientation of the Arab state should be taken into account, namely, the testing of the Russian Sputnik V vaccine, along with Western distrust of the Russian Federation [4].

The export and import of the Russian Federation with the United Arab Emirates also underwent changes at the beginning of the third decade of the XXI century. According to the Russian foreign trade website for 2021, exports of animal products increased by about 1.5 times compared to 2020, as well as for other items of Russian goods.

Код ТН ВЭД	Наименование товарной группы	Экспорт в 2021 г., долл. США	Доля в общем экспорте, %	Экспорт в 2020 г., долл. США	Изменения в 2021 г. относительно 2020 г., %
01	Живые животные	58 699	0,00	35 811	63,91
02	Мясо и пищевые мясные субпродукты	9 380 625	0,18	2 117 077	343,09
03	Рыба и ракообразные, моллюски и прочие водные беспозвоночные	48 746	0,00	3 310	1 372,69
04	Молочная продукция; яйца птиц; мед натуральный; пищевые продукты животного происхождения, в другом месте не поименованные или не включенные	2 318 131	0,05	3 084 654	-24,85
05	Продукты животного происхождения, в другом месте не поименованные или не включенные	0	0,00	55	-100,00
07	Овощи и некоторые съедобные корнеплоды и клубнеплоды	15 494 308	0,30	4 814 182	221,85
08	Съедобные фрукты и орехи; кожура цитрусовых плодов или корки дынь	41 494	0,00	33 505	23,84
09	Кофе, чай, мате, или парагвайский чай, и пряности	900 881	0,02	265 807	238,92
10	Злаки	16 537 662	0,33	172 368 966	-90,41
11	Продукция мукомольно-крупяной промышленности; солод; крахмалы; инулин; пшеничная клейковина	526 278	0,01	287 982	82,75
12	Масличные семена и плоды; прочие семена, плоды и зерно; лекарственные растения и растения для технических целей; соломка и фураж	593 667	0,01	460 358	28,96
13	Шеллак природный неочищенный; камеди, смолы и прочие растительные соки и экстракты	157	0,00	121	29,75
15	Жиры и масла животного или растительного происхождения и продукты их расщепления; готовые пищевые жиры; воски животного или растительного происхождения	24 828 999	0,49	467 132	5 215,20
16	Готовые продукты из мяса, рыбы или ракообразных, моллюсков или прочих водных беспозвоночных	158 396	0,00	42 277	274,66
17	Сахар и кондитерские изделия из сахара	214 510	0,00	487 093	-55,96
18	Какао и продукты из него	17 516 670	0,34	19 377 586	-9,60
19	Готовые продукты из зерна злаков, муки, крахмала или молока; мучные кондитерские изделия	418 582	0,01	270 759	54,60
20	Продукты переработки овощей, фруктов, орехов или прочих частей растений	362 025	0,01	491 701	-26,37

Picture 1. Russia's exports to the UAE in 2021 by product group [5]

According to the indicators for 2021, the import of Emirati goods to Russian markets was significantly less than the export component of relations, which caused the limited resource diversity of the UAE, as a state specializing in the sale of oil and other natural resources.

Код ТН ВЭД	Наименование товарной группы	Импорт в 2021 г., долл. США	Доля в общем им- порте, %	Импорт в 2020 г., долл. США	Изменения в 2021 г. относительно 2020 г., %
01	Живые животные	104	0,00	751	-86,15
03	Рыба и ракообразные, моллюски и прочие водные беспозвоночные	786 287	0,28	122 363	542,59
04	Молочная продукция; яйца птиц; мед натуральный; пищевые продукты животного происхождения, в другом месте не поименованные или не включенные	0	0,00	14 753	-100,00
07	Овощи и некоторые съедобные корнеплоды и клубнеплоды	32 697	0,01	872	3 649,66
08	Съедобные фрукты и орехи; кожура цитрусовых плодов или корки дынь	198 589	0,07	104 960	89,20
09	Кофе, чай, мате, или парагвайский чай, и пряности	26 384 974	9,55	22 900 100	15,22
11	Продукция мукомольно-крупяной промышленности; солод; крахмалы; инулин; пшеничная клейковина	64 197	0,02	0	∞
12	Масличные семена и плоды; прочие семена, плоды и зерно; лекарственные растения и растения для технических целей; солома и фураж	0	0,00	45 158	-100,00
13	Шеллак природный неочищенный; камеди, смолы и прочие растительные соки и экстракты	75 135	0,03	104 197	-27,89
15	Жиры и масла животного или растительного происхождения и продукты их расщепления; готовые пищевые жиры; воски животного или растительного происхождения	37 949	0,01	11 604	227,03
17	Сахар и кондитерские изделия из сахара	3 007 704	1,09	0	∞
18	Какао и продукты из него	144 155	0,05	117 531	22,65
19	Готовые продукты из зерна злаков, муки, крахмала или молока; мучные кондитерские изделия	73 084	0,03	52 772	38,49
20	Продукты переработки овощей, фруктов, орехов или прочих частей растений	774 758	0,28	660 890	17,23

Picture 2. Russia's imports from the UAE in 2021 by product group [5]

It can be noted that as of 2021, Russian-Emirati economic relations have shown a high result, however, the existing restrictions of the ongoing pandemic did not allow the full implementation of cooperation programs.

However, with the beginning of the confrontational period both in the European part and in the territories of the Middle East, the importance of interaction with Arab countries, including within the framework of international organizations, has increased for the Russian Federation. From 2022 to the present day, the BRICS is transforming into an economic bloc and gaining great attractiveness for states from all continents, which will fundamentally affect the balance of power

in the future. With the UAE's accession to the BRICS, the international economic organization has gained the opportunity to involve other Middle Eastern states to expand the emerging bloc and increase the investment part of relations within the organization. For the Emirates, joining the BRICS becomes a chance to expand their own markets for goods and services, but not an opportunity to confront the United States. [6].

In addition, at the next meeting of the BRICS member countries in Johannesburg on August 22-24, 2024, special attention was paid to the role of the Emirates that joined the organization, since the state is a kind of international "center" connecting the economic routes of the Far East and Europe, it becomes attractive to the BRICS and its participants, including the Russian Federation [7].

Summing up, we can safely talk about the serious dynamics of cooperation between the Russian Federation and the UAE, starting from 2011 and up to the present. The role of organizing interaction within the framework of BRICS remains an important stage not only in the economic, but also in the political dialogue of states by 2024, however, with an increase in the number of participants in the international organization, there is also a chance of partial reorientation of BRICS into a political bloc, which is not yet possible, but has prerequisites. States need to create new consulting agencies and mechanisms for the development of cooperation in the field of information, using the methods of organizing work in BRICS.

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INDICATORS OF FUNCTIONAL PREPARATION OF HIGHLY QUALIFIED BOXERS DURING THE PERIOD OF DIRECT PREPARATION FOR COMPETITION

Shchedrina Yulia Alexandrovna

*Doctor of Biological Sciences, Associate Professor, Professor
National State University of Physical Education, Sports and Health
named after P.F. Lesgaft,
Saint Petersburg, Russia*

Melnikov Dmitry Sergeevich

*Candidate of Biological Sciences, Associate Professor,
Head of Department
National State University of Physical Education, Sports and Health
named after P.F. Lesgaft,
Saint Petersburg, Russia*

Chernozipunnikova Elena Vladimirovna

*Junior Research Fellow
National State University of Physical Education, Sports and Health
named after P.F. Lesgaft,
Saint Petersburg, Russia*

Annotation. *The aim of the study was to determine the indicators of individual components of functional preparedness in highly qualified boxers during the period of immediate preparation for competitions. It was established that as a negative reaction to the upcoming load there is an excessive increase in the degree of tension of the neurohumoral regulation circuit and a decrease in the level of biological reserves of regulatory systems.*

Keywords: *functional fitness, heart rate variability, boxers, regulatory processes.*

Introduction. The preparation of athletes is a complex, multi-component process, each component of which makes a certain contribution to the ability to achieve maximum results. In the practical activity of a trainer, there is a need to select the most informative criteria of preparedness without using a large number of testing methods. The solution to this problem is the assessment of functional preparedness.

Functional fitness of an athlete is an integral characteristic that determines the body's ability to achieve maximum results, taking into account the specifics of the sport and the requirements of the stage of long-term training. The level of functional fitness determines the readiness to effectively implement motor actions specific to a particular sports discipline [3, 6]. Functional fitness is also manifested in the ability of various body systems to adequately ensure tolerance to specific loads and recover after their completion within a regulated time interval.

The components of functional fitness are practically identical for all sports disciplines, the difference lies only in the specific contribution of one or another component to achieving the highest result [3, 6]. For combat sports, which include boxing, the characteristic features are the operational nature of the activity, high mental tension, dynamism, non-stationary conditions for solving motor problems, and the dependence of the result on the characteristics of the opponent's counter-action [2, 5, 7].

At the same time, no less important is the efficiency of using the reserves of regulatory systems (adaptive potential), that is, the "economy" of the body's functioning under stressful conditions, the "biological cost" of performing training and competitive work, which can be attributed to the neurodynamic component of the basic level of the functional state.

The aim of the study was to determine the severity of shifts in the level of adaptive potential of regulatory systems in highly qualified boxers during the period of immediate preparation for fights.

Methods and organization of the research. The study involved highly qualified boxers aged 20-26 years, all athletes performed training loads according to a single program. The study was conducted a week before the fights. Heart rate variability parameters were recorded using the Varicard 2.52 automated system for processing cardiointervalograms and analyzing heart rate variability. The time and frequency parameters of the heart rhythm were assessed in accordance with the recommendations set out in the "Standards of Measurement, Physiological Interpretation, and Clinical Use" [1, 4]. Then the parameters of functional reserves (FR) and the degree of stress of the regulatory systems (RS) were calculated.

Research results. The results of the assessment of the adaptive potential of regulatory systems in subjects are presented in Figures 1 and 2.

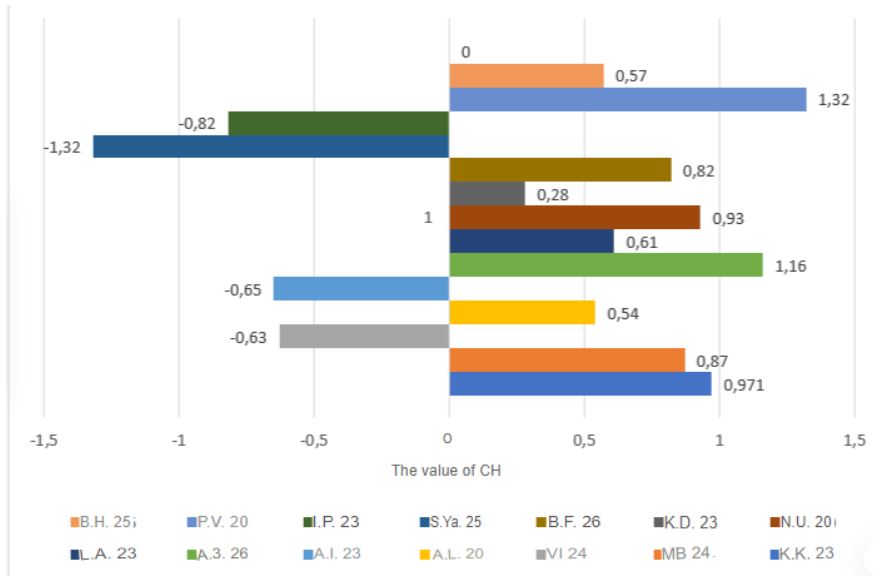


Figure 1. Values of the degree of stress of the regulatory systems in the examined boxers

The indicator of the degree of tension of the regulatory systems is associated with the activity indicators of the parasympathetic division (pNN50; HF) and reflects the protective, stress-limiting function of the regulatory mechanisms and the state of the vegetative balance. The physiological norm in this case should be characterized by negative values of SN, obtained by the formula:

$$HF = -0.697 + 0.015*HR - 0.001*SI - 0.132*pNN50 + 0.043*HF\% [4]$$

In the examined sample, only 4 out of 14 boxers (28%) correspond to the normal state. All other athletes have positive SN indicators, which indicates an increase in the share of sympathetic regulation and the central link in the management of body functions, which may indirectly indicate the development of a state of hyperadaptoptosis and, accordingly, the initial stage of overtraining.

The functional reserve index is an indicator of the mobilizing function of the body (SI and HR have the maximum “weight” in it) and can be quickly depleted with continued increased sympathetic activity. An adequate response in this case will be positive FR values not exceeding 3 c.u.

To calculate the value of the functional reserve stock, the following formula is used:

$$FR = 4.087 - 0.012*HR - 0.009*SI - 0.005*pNN50 - 0.006*HF\% [4]$$

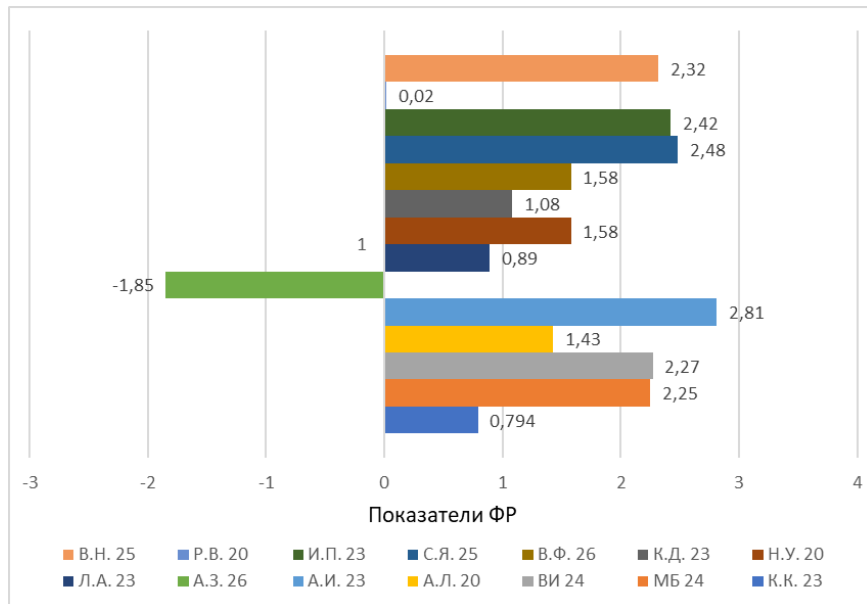


Figure 2. Results of determining the level of functional reserves of the regulatory systems in the examined boxers.

In the examined sample, positive values of the functional reserves indicator are noted in almost all subjects. The exception is boxer A.Z., who also has one of the highest SR indicators, which indicates a decrease in the ability of regulatory systems to maintain the current state and is fraught with a breakdown in adaptation. The FR value close to “0” in athlete R.V. is also accompanied by a high degree of stress and a tendency to exhaustion of the adaptation potential.

Conclusion. Highly skilled boxers in conditions of immediate preparation for competitions are characterized by positive SN indicators, which indicates an increase in the share of sympathetic regulation and the central link in the control of body functions, a decrease in the role of the autonomous regulation circuit and a decrease in the variability of the reaction to the impact of stress factors, as well as FR values approaching the upper limit of the norm. An inadequately high degree of stress in the work of regulatory systems in combination with a drop in the level of functional reserves can be considered a negative reaction indicating the development of overtraining syndrome.

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RESEARCH ON THE DOCKING OF DANCE EDUCATION AND JOB MARKET DEMAND IN VOCATIONAL COLLEGES IN CHINA

Yao Xinyi

Master, Postgraduate student

Belarusian National Technical University,

Minsk, Belarus

Abstract. *This study explores the connection between dance education and market demand in vocational colleges in China, analyzes the curriculum setting, teaching methods and teachers, evaluates the matching degree, studies the current situation and requirements of employment, finds that the education system is inadequate, needs to strengthen school-enterprise cooperation and practical teaching, and puts forward optimization suggestions to adapt to the market.*

Keywords: *vocational colleges, dance education, job market, school-enterprise cooperation, curriculum, teaching reform, market demand.*

1. Introduction

1.1 Research background and significance

With the increasing social demand for culture and art, the dance industry is gradually occupying an important position in China's job market. However, the dance education in vocational colleges still faces the problem of inadequate connection with the market demand. In-depth research in this field is helpful to improve the quality of education, enhance the employment competitiveness of graduates, and provide more suitable talent support for the cultural industry.

1.2 Research objectives and research questions

1.2.1 Research objectives

The purpose of this study is to analyze the matching between dance education and job market demand in vocational colleges in China, and find out the gaps and shortcomings between the two. Through the evaluation of curriculum, teaching methods and teachers, recommendations for improvement are made to promote the effective connection between education and market needs.

1.2.2 Research problems

- Whether the current curriculum and teaching methods of dance education in vocational colleges meet the market demand

- What is the employment situation in the dance industry and what are the specific requirements for dance talents
- How to improve students' employability through school-enterprise cooperation and practical teaching
- To address existing problems, how can the education system be optimized to better adapt to market changes

2.History and development of dance education in vocational colleges

2.1 Origin of dance education in vocational colleges

The development of dance education in vocational colleges is closely related to the needs of national cultural and artistic talents. In 1954, Beijing Dance School was established, marking the beginning of modern professional dance education in China. Initially influenced by the former Soviet Union, it focused on training professional dance talents with all-round performance ability. With the advancement of quality education, higher vocational colleges pay more and more attention to dance education, which is regarded as the key to improve artistic quality and comprehensive quality. The early model is single, although the quality is guaranteed, but it is difficult to meet the diversified needs. In order to adapt to the society, it is necessary to adjust the idea of running a school. Early emphasis on the combination of skills and theory, vocational colleges now explore new models, such as demonstration teaching, and set dance as a compulsory course, to cultivate students' aesthetic ability.

2.1.1 Development trend in recent years

In recent years, dance education in vocational colleges has undergone significant changes, mainly reflected in the introduction of modern dance, street dance and other emerging forms, and diversified education models, such as wisdom teaching, the combination of theory and practice, and personalized teaching. Zhang Xiang, business school of Shanxi University, stressed the need to keep up with The Times. The Research on the Development of Higher Dance Professional Education emphasizes that dance teaching should respond to the needs of The Times and build a teaching framework in line with the current environment. Finally, driven by the reform of the new curriculum standard, the space of dance education in higher vocational colleges continues to expand, and the course content and teaching methods have experienced innovation, which has improved the students' independent learning ability and the professionalism of teaching. At the same time, colleges and universities divide dance education into professional and mass according to different needs, in order to meet the diverse needs of society for dance talents.

2.2 Teaching content and teaching method

2.2.1 Curriculum and syllabus

Secondary vocational dance education needs a comprehensive education concept, market demand and social development, the curriculum covers the foun-

dation, practice, creation, such as basic skills, folk dance, etc., supplemented by physical and psychological training. The goal is to improve skills, comprehensive quality and innovative thinking, focusing on personalized teaching. In order to meet the market demand, we should optimize the curriculum, strengthen practice, expand application, implement integrated training, and strengthen practical operation and innovation. Innovative teaching methods, such as OBE concept and the application of “interest, emotion and beauty”, improve teaching quality and cultivate high-quality dance talents.

2.2.2 Innovation and challenge of teaching methods

In dance education, integrating traditional methods with modern technology is transformative. Advanced tools like AR, 3D modeling, multimedia equipment, flipped classrooms, and MOOCs enhance teaching. AR and 3D modeling aid in body improvement for dancers, while multimedia devices boost self-learning. Challenges include teachers’ lack of technical readiness and outdated textbooks. Solutions involve updating teaching concepts, emphasizing student-centered curricula, improving teaching systems, and fostering interdisciplinary collaboration. Multimedia devices enhance independent learning, smart technology supports skill development, and rich teaching materials elevate quality. Professional development activities and hands-on exploration of new technologies are crucial for teachers’ readiness. Interdisciplinary cooperation, like Simon Fraser University’s online dance program, nurtures innovation in dance education.

2.2.3 Teachers and educational resources

The current situation of dance teachers in Chinese vocational colleges reveals growth in quantity but challenges in quality. With the rise in dance student enrollments, the teaching team has expanded, yet sustainability and teaching effectiveness remain uncertain. Teachers’ professional skills and teaching abilities directly impact student development. Despite efforts to reform teacher specialization, inadequate teaching content and facilities, along with teachers’ overemphasis on personal skills over teaching abilities, hinder quality education. Traditional teaching modes lack modern techniques, making content dull and unsatisfying diverse learning needs. Excessive focus on skills over comprehensive literacy results in insufficient resources and market-unfit talents. To address these, measures include cultivating reflective teachers, integrating theory and practice, innovating teaching models, emphasizing overall student development, and expanding dance-related courses with practical, high-quality materials. Addressing individual differences, reforming traditional modes, and aligning curricula with market demands can enhance student engagement, competitiveness, and educational resource efficiency, exploring new talent cultivation approaches.

3. Conclusion Dance job market demand analysis

3.1 Employment status of dance industry

The implementation of college enrollment expansion has led to an annual increase in graduates, disrupting the job market balance, especially in sports dance.

The talent market has shifted from shortage to oversupply, intensifying employment pressure. Dance majors, while having diverse employment options, face challenges due to market demands, policy mechanisms, and outdated training. To improve this, universities must adjust training goals, enhance students' comprehensive qualities and innovation, and secure employment opportunities. Students should also strive to improve their abilities. In summary, the dance industry's employment outlook is challenging, requiring educational reforms, practical training enhancements, and improved career planning to address employment difficulties.

3.1.2 Changes in the demand for dance talents in the job market

The growth of social economy and living standards has fueled the demand for spiritual and cultural life, driving the expansion and diversification of the dance art market. Dance now extends beyond theater to TV, dance halls, tourism, and corporate culture, broadening the scope for dance talents. Despite this, dance graduates face significant employment pressure due to college enrollment expansion. To address this, studies propose optimizing course structures, teaching content, and increasing internships to meet employment needs. Universities should be market-oriented, improve teaching systems, and strengthen dance culture awareness and career guidance. With the diversification of the dance market, universities and society should collaborate to enhance dance graduates' employability and adaptability through educational reforms and practical teaching.

3.2 Matching of professional ability and market demand

3.2.1 Market requirements for dance professional skills

Market requirements for dance professional skills focus on technical skills, artistic expression, innovative ability and comprehensive quality. Technical skills are the foundation, artistic expression is the soul, innovation ability to adapt to aesthetic improvement, comprehensive quality requires the integration of dance, skills. Dancers need to constantly improve to adapt to market changes. Dance professionals need to have good physical quality, cultural connotation, professional technology and innovative quality. The basic quality is the basis of performance and affects the performance level. Choreographers also need to be highly professional, including dance background, cultural literacy, etc., in order to create excellent works. Innovation quality is important to improve the ability of dance practice. In the process of education, in addition to the cultivation of professional skills, it is necessary to pay attention to the improvement of comprehensive qualities such as ideological, political, cultural and knowledge.

3.3 Cooperation between vocational colleges and enterprises

3.3.1 School-enterprise cooperation model and case analysis

Through school-enterprise cooperation, the dance department of Shaanxi Art Vocational College changes the education model and pays attention to talent output and quality training. Although there are "four stages" and other successful

models, the practice still faces challenges such as single cooperation, lack of innovation, mismatch between supply and demand, and inconsistent goals. Successful cases show that top-level design, reform goals, and curriculum systems can promote cooperation. The construction of school-enterprise collaborative teaching system requires the deep participation of enterprises. School-enterprise cooperation in dance majors can improve education quality and employment competitiveness, but it needs to overcome challenges, learn from experience, optimize the model and promote development.

3.3.2 Internship and employment channel expansion

The education system needs to optimize the structure and content of the curriculum to meet the needs of employment, and colleges and universities should work with industry to adjust the curriculum and teaching methods and increase practical teaching. Internship is the key to connect theory and practice. Colleges and universities should attach importance to the quality of internship, establish an evaluation system, and provide more high-quality internship opportunities. At the same time, pay attention to the comprehensive development of students, enhance the competitiveness of employment. In order to broaden employment channels, colleges and universities can cooperate with multiple institutions to provide employment information. In the face of market changes, dance majors need to constantly innovate education models, such as combining work with study, to improve employment rate and satisfaction. In short, dance internship and employment require the joint efforts of universities, industries and society to improve students' employability and prospects by optimizing education, strengthening practice, broadening channels and innovating models.

4. Summarize

The dance education system faces a gap with market demand, manifested in traditional curricula, theory-heavy instruction, limited practice, and unclear career paths. This hinders student development and competitiveness. To bridge this gap, practical teaching, modern technology, industry connections, and curricular adjustments are essential. School-enterprise cooperation links education to market demand, enabling precise talent cultivation. Establishing practice bases, project collaborations, expert lectures, and internships strengthen practical skills and competitiveness. Studying industry trends, talent models, and education-industry integration, leveraging big data, and tracking market changes are key. Flexible education systems, including modular curricula, credit management, regular assessments, rapid response mechanisms, teacher training, and IT applications, effectively address market shifts.

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THE UNIVERSITY OF MY DREAMS: MY CAREER IS MY BUSINESS PLAN

Rozhkova Evgeniia

Student

*Integration XXI Century Secondary School,
Moscow, Russia*

Abstract. *This article weaves together the motives of a modern IB Diploma Programme pre-graduate in obtaining higher education at a university and the basic concepts of Business Management. Applying such subject-specific terms as “business plan” and “customer segment”, the author explores how a “university of their dreams” would encourage creativity, identity and focus on practical knowledge in the field of cartoon animation. More to that, the author discusses how collaborating with like-minded people on a multi-cultural level would benefit young individuals and motivate them to constantly seek new ways to communicate their ideas.*

Keywords: *university, value, career, animation.*

I have been passionate about cartoons and storytelling since I was 3 years old. Hence, embarking on a career path as a 2D animator and character creator became my life goal. In 2023, I became an International Baccalaureate (IB) Diploma Programme student [1] and took Business Management and Visual Arts as some of my subjects. Inspired by this curriculum choice, the idea of establishing an animation studio myself and becoming a business owner sparked in my mind. Therefore, aiming to get closer to achieving this goal, I have developed the following “business plan” that I intend to pursue after I graduate from high school.

First of all, it is worth noting that some of the basic requirements that a university needs to offer to meet me as a specific customer segment include a rich variety of extracurricular courses. For instance, I look forward to participating in a student book club and meeting people that are enthusiastic about discussing various works of literature or playing violin in the university orchestra alongside fellow violinists. The reason behind this is that my interests and hobbies vary from learning languages to fitness and wellbeing, ergo I sincerely hope to enter a university that would embrace my skills and the love of learning.

As a passionate learner and content creator, I value communication and the opportunity to share my ideas with others. Therefore, I would prefer a university that mirrors these traits in its corporate culture and invites the students to demonstrate their skills at campus competitions or exhibit their works and personal projects at student community places. One of the other key communication channels for me and other young adults is the mentorship the university could provide to those in doubt about their career choice, internal assessments or other issues with their curriculum. On the grounds of this is that people in their early twenties tend to question their life choices rather often (InfinumGrowth, 2019 [2]). Due to this reason, I regard universities that establish trustworthy and mindful relationships with their students, providing guidance from professional career coaches or education experts. Consequently, I expect that this communication channel would help students like me to develop a confident career path and be acknowledged in their work choices and preferences.

Similarly, my future university should focus its expenses on technologies that would allow the students to be creative in a modern fashion. This includes top paid software for 2D animation, namely an Adobe Animate subscription or Toon Boom Harmony licence (Linearity blog, 2024 [3]). As a learning enthusiast, I am eager to try out new ways of expressing my ideas and bypass the financial limitations that I have as an individual user. Therefore, getting access to advanced creative tools would be an ideal kind of revenue I could get from my university.

Apart from the revenue stream, the key resources that will guide me towards making the best career choice also need to be taken into account. In my estimation, the most important information for me is the selection of courses that the university would offer. To illustrate this, I am interested specifically in character creation, thereby my 2D animation curriculum would need to be focused on designing appealing visual appearances and complex personalities of the fictional characters. Nonetheless, highlighting that I will graduate from IB DP by June 2025, I additionally need to verify if my desired university is ready to accept my IB diploma, using the official recognition database (International Baccalaureate, n.d.).

Building upon revenue streams, another trait that I consider vital in a university is its commitment to investing its key resources in multicultural exchange. This means that an educational institute that encourages its students to visit famous animation schools abroad would be a fitting choice for me. To exemplify this, completing a course at Gobelins in France (Discover France & Spain, 2019 [4]) would provide aspiring cartoonists, including me, an opportunity to experience diverse styles of education that would be helpful in their future career choices.

Taking the key activities into consideration, I firmly believe that the ideal kind of partnership that my potential university could offer is an internship in multinational mass media companies that focus primarily on animated films (e.g. The

Walt Disney Company, Pixar Animation Studios or Blue Sky Studios). In particular, being an apprentice in one of these organisations would allow me to strengthen my 2D animation skills, which could evolve into an impressive professional portfolio. It also should be noted that on a larger scale, the experience of working with an employer that is highly regarded in the market of cartoons could add more credibility to my resume when applying for a future job, enhancing my trustworthiness as an employee candidate.

To crown it all, I expect the cost structure of my future university to include the tuition fee and one prepaid extracurricular activity of my choice. Nevertheless, I am aware that maintaining some of the student clubs or exchange programs would require additional funds. Thus, I do not expect many options to be included in the initial price. After all, the business model of my career is primarily value-driven as I am a passionate learner eager to master my desired degree.

In conclusion, in order for me to successfully pursue a career as a 2D animator and character designer, my ideal university should offer a wide selection of extracurricular courses, internships in famous mass media companies worldwide, mentorship and the latest professional software for animators and cartoonists. It should also be noted that getting an opportunity to explore my skills apart from the curriculum is a vital trait that I am seeking in a university.

Therefore, I can safely assume that the best educational institute for me would be a place that encourages its students to constantly search for new ways to express their creative ideas and communicate with others in the same field on campus and abroad.

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**THE HISTORICAL AND CULTURAL ASPECT IN TEACHING
RUSSIAN LITERATURE AT THE IMPERIAL HELSINGFORS
(ALEXANDER) UNIVERSITY (BASED ON CORRESPONDENCE OF
Y.K. GROT (1812-1893) AND P.A. PLETNEV (1792-1865))**

Bondarenko Natalia Alexandrovna

Associate Professor

Institute of Languages and Cultures named after Leo Tolstoy

Abstract. *The article reveals the significance of the epistolary heritage of Russian professors PA Pletnev and Y.K. Grot. For thirteen years (from 1840 to 1853) they carried on an active correspondence, in which they touched upon topical issues of public life in the first half of the 19th century, as well as on the teaching of the Russian language and literature at the Helsingfors (Alexander) University. The article describes for the entire Slavic world.*

Keywords: *Helsingfors University teaching, Russian literature, correspondence, Y.K. Grot, P. A. Pletnev.*

Introduction

The revival of the original character of Russian culture, the expansion of the information field, and the strengthening of the role of the Russian language and literature in the “borderlands” (particularly in the Grand Duchy of Finland within the Russian Empire) were tasks that the 19th century was meant to address.

In this context, a certain scientific interest is represented by the epistolary legacy of Peter Alexandrovich Pletnev (1792-1865), rector of the Imperial Saint Petersburg University, professor, and editor of the journal “Sovremennik,” and Yakov Karlovich Grot (1812-1893), professor of Russian history and literature at the Imperial Helsingfors (Alexander) University. The works of these two renowned scholars have been referenced in studies by A.P. Zinovyeva, T.N. Zhukovskaya, A.V. Koveh, and N.A. Bondarenko.[3]

For thirteen years (from 1840 to 1853), P.A. Pletnev and Y.K. Grot engaged in active correspondence, touching on various aspects of public life in the first third of the 19th century. Reflections on national priorities and the formation of Russia’s image among the students of Helsingfors (Alexander) University; issues related to the teaching of literature and language; notes about meetings and conversations among close friends—these are all found in their letters.

I. Scientific activity of Professor Peter Alexandrovich Pletnev (1792-1865)

The name of Pyotr Alexandrovich Pletnev (1792-1865), a writer, a close friend of A.S. Pushkin, editor of the *Sovremennik* magazine, and publisher, was well known in the literary and scientific circles of the 19th century.

In 1832, at the invitation of the Minister of Public Education S. S. Uvarov (1786-1855), P. A. Pletnev was accepted to the position of full professor of the Department of Russian Literature at St. Petersburg University and, at the same time, to the Main Pedagogical Institute. He taught at the university until 1849, when a decree was issued exempting university rectors from the obligation to give lectures [4]

An important role in the formation and development of views on the literary process was played by P.A. Pletnev's participation in the discussion about nationality in literature, which unfolded on the pages of the "Journal of the Ministry of Public Education" (JMPE in the future), of which he was an employee.

According to S.S. Uvarov's concept, the Russian people have already formed as a nation, they have deep faith, a great history and great victories; their literature is unique in its purity. Unlike Western civilization, which has lost its moral values and is on the brink of disaster, Russia has preserved the religious, political and moral ideals of Orthodoxy, autocracy and nationality, which, with decisive and thoughtful actions by the government, will contribute to the prosperity of the empire. At the same time, creating an ideal image of Russia on the pages of the Journal of the People's Commissariat of National Economy and Public Administration, the minister understood that this image was still far from reality. However, S.S. Uvarov conceived of Russia's superiority over the West primarily as a spiritual victory.

These thoughts were close to Professor P.A. Pletnev; in his article on nationality in literature he noted that in the word "...nationality...we read our most sacred duties. We understood that the successes of our national history, national legislation, national literature, in a word: everything that directly leads a person to his civic purpose, should always be in our hearts." [5]

These ideas will later be formalized by P.A. Pletnev in the program for reforming the teaching of the Russian language and training of school teachers at the university, defining the composition and tasks of the new department, or rather, Russian studies as a whole direction, as well as in his recommendations to Y.K. Grot on the teaching of history and literature at the Imperial Helsingfors (Alexander) University.

II. Facts of the biography and activities of Yakov Karlovich Grot (1812-1893) at the Imperial Helsingfors (Alexander) University.

Yakov Karlovich Grot (1812-1893) came from a family of Russified Germans. His father, Karl Efimovich Grot, a former "comrade in education" of Alexander II,

was married to a Russified St. Petersburg German woman, “who loved everything Russian and raised her children in love for the Russian language and people, in affection and gratitude for Russia.” [6]

Yakov Karlovich and his brother Konstantin studied at the Tsarskoye Selo Lyceum and graduated with honors. The eldest of the brothers, academician Yakov Karlovich Grot, became widely known not only in Russia but also in Finland.

He first visited the Grand Duchy of Finland in 1837, then in 1838-1839, and in 1840, together with his mother and sister, he moved permanently to Helsinki.

In the late 1830s, there was a need to improve the teaching of Russian in Finland. Yakov Karlovich Grot, an expert in Scandinavian mythology and an excellent Swedish speaker, was in charge of inspecting Finnish schools for teaching Russian from 1840. A year later, he became a professor at the Department of Russian Language and Literature at the Imperial Helsingfors (Alexander) University. Later, his duties included overseeing the teaching of Russian in educational institutions in the Grand Duchy.

During this period, his books on the study of Russian language, literature and history were published in Swedish in Finland. Yakov Karlovich, as a university professor, initiated the creation of a Russian book collection, which later became the prototype of the modern Slavika, which is now located in the National Library of Finland.

It was during this period that the beginning of a long-term weekly correspondence between Y. K. Grot and his older friend P. A. Pletnev, a professor at St. Petersburg University and editor of the famous journal *Sovremennik*, began.

In 1853, Y.K. Grot and his family left Helsingfors, where he had lived for almost thirteen years. In Russian science, he was rightly considered the best expert on Finland. Arriving in St. Petersburg, he became vice-president of the Russian Academy of Sciences. At the same time, Y.K. Grot is known as the teacher of the future Emperor Alexander III, to whom he taught Russian and German, history and geography.

III. Basic recommendations of the professor of St. Petersburg University P.A. Pletnev to professor Y.K. Grot on the teaching of Russian history and literature at the Imperial Helsingfors (Alexander) University.

As noted earlier, in the late 1830s, there was a need to improve the teaching of Russian in Finland. Representatives of the Grand Duchy of Finland in St. Petersburg — Minister-State Secretary R. I. Rebinder and his successor A. G. Armfelt — advocated strengthening ties with Russia, and the highest dignitaries of the Grand Duchy of Finland were even prepared to accept Russian as the official language instead of Swedish.

The appointment of Yakov Karlovich Grot to the position of professor of the Department of Russian Language and Literature at the University of Helsinki was

not accidental. He knew Swedish perfectly, was an expert in literature and epic poetry, and was the translator of the Swedish poet E. Tegner's "Frithiof's Saga"; he was also acquainted with F. Signaeus, a professor of history at the Alexander University.

In August 1841, Y.K. Grot began preparing lectures according to the instructions drawn up for a professor of Russian history and literature. However, his hopes were clouded by the students' poor knowledge of Russian, which he reported to P.A. Pletnev: "the students do not understand Russian." Then Y.K. Grot decided to begin compiling a lexicon – a Swedish-Russian dictionary, for which he received "a sum from the Sovereign" [7].

From the first days of his teaching career, Y.K.Grot encountered students' lack of interest in studying Russian literature. He wrote to P.A.Pletnev with regret about his failures and received a clear and precise answer: "You are a professor of Russian language, Russian history and literature, firmly remember that you were made an apostle of the Russian language in a foreign land. The main goal is the development of the Russian language." [8].

Y.K. Grot, as he himself put it, took upon himself the mission of being "the apostle of the Russian language on the Chukhonian land" [9]. The apostolic ministry of Y.K. Grot was manifested in the publication in Swedish of the "Textbook of the Russian Language" (1849), "Books for Reading", "History of Russia before Peter the Great" (1850-51), as well as articles published in "Sovremennik" to familiarize Russian society with the literary monuments of Sweden and Finland, etc.

Judging by the style of correspondence between the two professors, it can be seen that their relationship is still that of an elder and a younger. As a rule, P.A. Pletnev acts as a consultant; as an experienced teacher, he gives advice to Y.K. Grot on the choice of teaching methods and comments on his successes.

When preparing a new lecture course, P.A. Pletnev suggested that he combine the teaching of modern Russian literature and history, pointing to Karamzin's History as "ready-made material for everything." At the same time, P.A. Pletnev believed that modern history and literature were more important than ancient ones: "Speak about our ancient history and literature faster and hurry to the flourishing times of our prose, poetry and diplomacy" [10].

To Y.K. Grot's questions on teaching Russian history, P.A. Pletnev answers that for a lecturer the unchanging rule remains important: following the truth and justice. And therefore, in the course of history, no compromises are needed: "delicacy is a fine thing, but now it must go to the side when we stand up for the truth..., thought must not be servile" [11]. (From a letter from P.A. Pletnev to Y.K. Grot dated April 18, 1841).

His thoughts on how to awaken the interest of Finnish students in studying the political history of Russia are interesting, it is necessary to "act like a smart, sub-

tle and far-sighted politician”, including reviews of works of Russian literature, enriching the lecture material with new information. In his opinion, the lecture should have clarity of opinion, a new view or the plot itself.

P.A. Pletnev generously shared his teaching experience with the young professor. Using his own work and that of other professors of Russian studies, he drew up a teaching plan for Grot based on a large block of modern literature. This plan, as processed by Grot, became the basis for teaching Russian philology at Alexander University.

P.A. Pletnev considered lectures that reflected the political history of the Northwest to be especially important; in his opinion, they should be useful to those Finnish students who were preparing to teach at school and for civil service: “According to my plan, the history of Russian literature should be included as an addition to each period of our political history. It is possible to gloriously compress both, and to develop our relations only with the Northwest” (letter of April 13, 1841) [12]

Reflecting on pedagogical activity, Y.K. Grot shares his thoughts on “what could arouse their (students’) zeal for the expression of it (the Russian language)? Literature is still poor, language is difficult, love alone can have a strong effect – and that is why Russians should not miss the opportunity to attract the hearts of the local youth.” And then he reflects on the fact that if “we want them... to be convinced that we are not cannibals,... we must first of all elevate in the eyes of foreigners the value of our language, our faith, literature and everything that is connected with the life of our fatherland.” [13] (from a letter from Y.K. Grot to P.A. Pletnev dated October 8, 1840)

It was on P.A. Pletnev’s advice that Y.K. Grot was to combine the teaching of history and modern or “high” Russian literature. Grot prepared a lecture course, teaching aids, and chose the format of lectures, striving to teach more freely. In one of his letters, he reported that he suggested to the students that the lecture be held in the form of a conversation, to which “everyone agreed, and the hour passed unnoticed. If everyone continues to agree, then I will have taken a very important step for the teaching of the Russian language” [14]

The free form of conducting classes on modern literature, which was the “highlight” of Pletnev himself and suggested by him, later became the basis for teaching Russian language and literature at the University of Helsinki. At his lectures, students’ compositions were also read (for example, third-year student Pavel Ershov read his “The Little Humpbacked Horse”), debates were held, and remarkable literary news was discussed.

In conclusion, we note that the correspondence between the two Russian scholars touched upon many issues on: motivation of Finnish students to study Russian; integration in teaching modern Russian literature and history; inclusion of facts

about the history of the North-West (regional component) in the lecture material; use of various informal forms of conducting classes (free discussion, conversation, etc.).

IV. Conclusion

Both correspondents, P.A. Pletnev and Y.K. Grot, firmly defended national values, setting an example of the best representatives of the educated society of the era.

The rector of St. Petersburg University was the author of the law on strengthening the teaching of Russian language and literature, which reflected “issues of teaching Russian and local folk history in the outskirts.” He supported the idea of Y.K. Grot to publish a book about the Russian North and, answering the question of what the European North is, noted that Russia, Poland, Livonia, Finland, Sweden, Norway, Denmark - here you have the history of the North... “the main thing is to add interesting colors to the history of Russia and mathematically prove what a blessing it is for the annexed provinces that the Lord has granted them this lot...”. [15].

In conclusion, we note that in their letters, Y.K.Grot and P.A.Pletnev appear before us as true patriots who firmly defend national values. Realizing their responsibility to the Fatherland, they followed F.M.Dostoevsky, who asserted that - The Russian people know nothing higher than Orthodox Christianity, it is a living feeling that has become one of those living forces in our people, without which nations cannot live. Their epistolary heritage clearly manifested “conciliarity” and “Easternness” – those very codes of Russian culture that form the basis of national self-awareness.

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WHAT DOES THE NINTH PLANET AND INTERGENERATIONAL COMMUNICATION HAVE IN COMMON

Astakhov Alexander Viktorovich

*Candidate of Pedagogical Sciences, Associate Professor
Kaluga State University named after K.E. Tsiolkovsky*

Grechishnikov Sergey Egorovich

*Candidate of Philosophical Sciences, Associate Professor,
Independent Researcher*

Abstract. *Science already has convincing evidence that celestial bodies are the most important objects capable of forming the periodicity of earthly processes. A.L. Chizhevsky wrote at the beginning of the 20th century that “everything earthly pulsates in the rhythm of the Sun.” The article examines the patterns of self-development of the Solar System in relation to some phenomena of human social life. The authors proceed from the ontological reading of the “Fibonacci number” and the hypothesis about the dependence of social processes on the movement of celestial bodies. According to the authors, if five generations of people live on Earth at the same time, this will make it possible to achieve the corresponding critical mass of the combined generational intelligence. In this case, it will be possible to solve many pressing issues of global human survival much more effectively.*

Keywords: *collective intelligence, Fibonacci number, intergenerational communication, astronomical component of social processes, Ninth Planet.*

Leonardo Pisano (Fibonacci) in 1202 discovered a numerical sequence that scientists called the “golden series” or “golden section”. The numerical sequence presented by the medieval mathematician is that each subsequent number is equal to the sum of the two previous ones.

Modern scientists have established that the golden section reflects many processes occurring in living and nonliving Nature, and the coefficient introduced by Fibonacci (1.618 and 0.618) is not accidentally called the “number of God”. This coefficient manifests itself everywhere: in cosmic processes and in human sociality.

The goal of our work is to show the connection of the golden section with the patterns of self-development of the Solar system and some phenomena of human social life.

We have arranged all the planets of the Solar system in a column in order of increasing speed of their rotation around their axis, and the planet itself is designated by the number of its proximity to the Sun. This ranking is presented in Table 1.

Table 1
Ranking of the planets of the Solar System by the speed of rotation around their axis

Planets	Rotation period of planets (seconds)	Planet number, relative to proximity to the Sun
Venus	20996815,68	2
Mercury	5067031,68	1
Ninth Planet	1176590,3	9
Mars	88642,66	4
Earth	86164,1	3
Uranus	62063,712	7
Neptune	57996	8
Saturn	38362,464	6
Jupiter	35430	5

As we can see, the Earth occupies a central place in this sequence, which speaks of its uniqueness. The first five planets are terrestrial planets, that is, celestial bodies that have, in addition to other distinctive characteristics, a solid surface. If we add the ordinal numbers of the first four planets and the ordinal numbers of the last four planets, we get the numbers 16 and 26, respectively.

Now let’s take the social sphere, namely the generational structure. The maximum possible number of generations can reach five. Scientists prove that the human body is designed for a lifespan of up to 120 years, which includes five generations. B. Ts. Uralnis in his work “Population: Research, Journalism” gives examples of such longevity [4].

Let’s consider the generational structure ranked according to the principle of genetic integrity (table 2).

Table 2
Generational structure ranked according to the principle of genetic integrity

Generations	Fibonacci Number Sequence
Great-great-grandparents	2
Great-grandparents	3

Grandfathers and grandmothers	5
Moms and dads	8
Children	13

Based on the data from the two tables, a correlation is evident in the pair “astronomical-social”. If we divide 26 by 16 and vice versa, 16 by 26, then 13 by 8 and vice versa, then in both cases we get a coefficient of 1.625/0.615.

In science, such coincidences cannot seem accidental. As a hypothesis, we put forward the thesis about the unique significance of the Ninth Planet in the history of human civilization. The calculations we have provided show that without the Ninth Planet, the entire astronomical-social architectonics is destroyed. In previous works, we calculated the period of its revolution around the Sun, which was 12,233 years [1, p.104-105].

The planets of the Solar System, interacting with each other and having their own functional significance, act as a holistic astronomical phenomenon. The Ninth Planet, possibly being outside the Solar System, temporarily loses its connection with its planets.

It is known that if one of the elements falls out in any system, the functioning of its individual elements changes, especially those that have the closest connections. We have identified the interdependence between the rotation periods of the Moon and the Ninth Planet. The Moon rotates around its axis exactly twice as slowly as the Ninth Planet ($2360591.51 \div 1176590.3 = 2.0$). Thus, there is reason to believe that in this case the integrity of the most important processes of biological and social life of planet Earth will be disrupted.

Now the Ninth Planet is at the greatest distance from the luminary and its influence on earthlings is negligible. Mathematical calculations show that this planet 6,000 years ago could have been between Venus and Earth. Modern researchers prove that 6000 years ago was the time of the explosive birth of the first known and already very advanced civilizations. The famous pyramids in Giza were built at that time. The approach of the Ninth Planet caused the acceleration of progress. More precisely, the approach ensured the flow of psychophysiological processes with the least energy costs. But, on the other hand, this also led to natural cataclysms of the 5th-4th millennia BC: the universal flood, destructive earthquakes, disastrous tsunamis and increased volcanic activity.

Scientists have also established that the planets, moving along a closed elliptical orbit, are capable of forming processes on Earth that repeat themselves with the highest precision.

Already the Chaldean astronomers, based on the brilliant guesses of the priests of Egypt and Mesopotamia, developed a doctrine of the connection between earthly processes and the movement of celestial bodies [2, p. 42]. It was the Chaldeans

who created astrology as a kind of symbiosis of mantics - the art of fortune telling - and science. Modern natural science explains this connection as follows. According to V.A. Sukhorev, each planet generates an electromagnetic and gravitational low-frequency wave into the surrounding space, with a period equal to the period of revolution of this cosmic object around the Sun [3, p.87]. Thus, in all living organisms inhabiting the Earth and in the human body, including, processes (biological rhythms) are formed, synchronized with gravitational and electromagnetic phenomena occurring in Space [3, p.93].

We believe that this influence concerns not only physiological indicators and the human psyche, it can affect social life and historical events.

Today, science knows a large number of periodically repeating processes both in the human body and in social life: from short ones with a period of fractions of a second to global ones with a period of several millennia.

Therefore, our attention was drawn to the question of the possible influence on human psychophysiology, social life and historical events of the ninth and still hypothetical planet of the Solar System. Today, some parameters of this planet are known, but there is no explanation of its role and place in our System. We tried to explain this role.

However, we suggest not stopping there and recommend using Fibonacci's discovery, as well as our hypothesis, in the formation of the collective intelligence of humanity. For brevity, we will call it "collective intelligence".

Living creatures that have some analogue of "collective intelligence" include bees, ants, termites, wolves, killer whales and some other species. All these creatures work together to satisfy the needs of the family. They share food with each other and take care of their offspring. Bees are the most famous example of creatures with a "collective mind".

Collective intelligence or collective mind is a term that emerged in sociology in the mid-1980s when studying the phenomenon of collective decision-making. Scientists from NJIT defined collective intelligence as the ability of a group to find solutions to problems more effectively than the best individual solution in this group [5]. In this regard, collective intelligence surpasses the intelligence of any individual in the group.

By now, when Planet Nine is extremely far away, humanity has objectively exhausted its ability to provide a heuristic leap, continuing to simply mechanically increase the population of Homo sapiens. As is known, the properties of a system are not equal to the sum of the properties of its parts.

However, there is a way out. And it is not limited to monocausality. One of the options is as follows. We need to combine such parts of the system that will create a fundamentally new quality of heuristic activity. In our opinion, the solution is to ensure intergenerational communication. Communication of all five generations. Never before has humanity focused on this opportunity.

Intergenerational communication is a synergetic process of information and activity interaction of representatives of different generations. This process will not develop on its own. Humanity will need to make special serious efforts to increase life expectancy and to form a culture of intergenerational communication.

In this paper, we will not describe the methodology of future intergenerational interaction. This is a task for another work. What is important for us now is that the creation of a collective mind with the help of intergenerational communication is possible precisely because it is embedded in the foundation of the universe itself and is subject to the universal laws of the Universe.

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PSYCHOLOGICAL FEATURES OF THE TIME PERSPECTIVE OF MODERN YOUTH

Mukhanova Irina Fedorovna

*Candidate of Psychological Sciences, Associate Professor
Donetsk State Medical University named after M. Gorky*

Annotation. *The article presents the results of the analysis of various domestic and foreign theories of time perspective. General psychological ideas about time perspective are revealed. The results of the empirical study reveal the main psychological characteristics of time perspective among student youth.*

Keywords: *time perspective, life perspective, life planning, life path, modern youth, futurological survey.*

Today the pace of development of social structures is accelerating, the forms of life of society are becoming more complex and, in connection with this, young men and women find themselves in conditions of extreme uncertainty, which is manifested not only in the choice of profession, but also in the further path of life. In rapidly changing modern conditions, a person who is distinguished by purposefulness, activity, the ability to quickly respond to changes in the environment, make plans, forecasts and possessing personal resources becomes in demand. In adolescence, young people face the problem of the formation of a temporary perspective of the individual, as a system of a person's ideas about his past, present and future, their experience and attitude towards them.

Interest in the future is one of the constants of human thinking and, in essence, is a way of understanding the possible consequences of decisions taken, allowing us to consider and evaluate various options for achieving the goal. But in the conditions of a changing world in social, political and economic spheres, as well as military conflicts, people's perception of time, their own lives and their place in it changes. Given the need to solve this problem, both at the theoretical and practical level, the topic under study seems particularly relevant.

It is obvious that the radical changes that are happening in the world have affected various aspects of the lives of our youth. The severity of socio-economic problems has led to a spiritual crisis in society, which is accompanied by emotional discomfort for people. In recent years, the problem of the inability of the

younger generation to manage their life time in a valuable way, to build a life perspective, to set goals in the future that are significant for the subject and colored with personal meaning has been widely discussed.

The relevance of our research is due to the fact that the study of time perspective acquires special significance in student age, when ideas about one's future, awareness of the past, and construction of one's life path are the basis of life self-determination and influence subsequent significant choices and the fulfillment of one's purpose in civilization.

The category of time in psychology has acquired its special significance in connection with the formulation of questions about the temporal concepts of the individual and the construction of one's life. In understanding the "time perspective" of the individual, one can distinguish a wide variety of approaches, among which is the consideration of the time perspective of the individual as a motivational formation that ensures the satisfaction of the need to achieve set goals, develop plans and decision-making strategies (Z. Zaleski, F. Zimbardo, T. Cottle, K. Levin, V. Lens, J. Nutten, L. Frank, P. Fress, H. Heckhausen); expected and programmed events with which a person connects the meaning of his life (A. Adler, B.G. Ananyev, E.I. Golovakha, E.V. Kamneva, A.A. Kronik, A.N. Leontiev, G. Allport, S.L. Rubinstein, V. Frankl); cognitive plan of the future (M.R. Ginzburg, I.V. Dubrovina, I.S. Kon, S.V. Krivtsova, O.V. Kuznetsova, N.N. Tolstykh, D.I. Feldshtein, E.A. Shcherbakova, P.I. Yanichev); the result of anticipation of future events (P.K. Anokhin, N.A. Bernshtein, G.E. Zhuravlev, V.A. Ivannikov, L.A. Regush, I.M. Feigenberg); ideas about the future in the professional sphere (K.A. Abulkhanova, M.R. Ginzburg, E.I. Golovakha, E.A. Klimov, A.A. Kronik, N.S. Pryazhnikov, I.A. Ralnikova, etc.); the influence of memories on a person's perception of his past, present and future (A. Adler, E. Berne, K. Rogers, B.M. Ross, A. Freud, Z. Freud, E. Fromm, K.G. Jung, etc.).

An analysis of the ideas of these authors shows that there is a certain scientific paradigm in understanding time perspectives. The concept of time perspective was introduced by K. Levin and is characterized as "the universality of the individual's views on the psychological future and psychological past, existing at a given time on real and various unreal levels" [11]. B.V. Zeigarnik shares this opinion, understanding time perspective as "the inclusion of the future and the past, the present and the unreal plan of life in the plan of the present moment" [3]. From the point of view of L.K. Frank, who first introduced this concept into scientific circulation in 1939, "time perspective" is understood as the "life space" of the individual, including the past, present and future [9].

According to J. Nutten, time perspective is a certain mutual arrangement of objects (events) in time in the consciousness of a person in a certain situation (events that make up the time perspective of the past emerge from active memory; the

content of the time perspective of the future is created virtually from the goals and events that a person wants to achieve) [10]. The characteristics of time perspective are: depth or length (time intervals between a sequence of events); richness (the density of distribution of events in different periods of life); structuring (the presence or absence of conscious connections between events); realism and vividness of events in a person's perception. In the understanding of J. Nutten, time perspective acts as a function of the motivational objects that comprise it, determining its depth, structure, degree of reality, substantive characteristics, etc. [10].

P. Fress uses the term "time horizon", which refers to the concept of time perspective, defining it as an integrative characteristic of the development of time concepts and time relations of the individual, formed in the process of life in society. Time horizon characterizes the ability of the individual to create memories and anticipate the future [8].

T. Cottle's work is based on the understanding of time perspective as "a person's ability to act in the present in light of the anticipation of relatively distant future events" [7]. F. Zimbardo considers time perspective as a situationally determined process, which is influenced by biological, sensory and social stimuli, and at the same time as a stable variable of individual differences [4].

Studying the role of time in human life, K.A. Abulkhanova-Slavskaya, based on the ideas of S.L. Rubinstein and B.G. Ananyev, primarily relies on the organization of the subject's time, its criteria, mechanisms and means of implementation. She suggests distinguishing between psychological, personal and life perspectives as three different phenomena [1]. It is the psychological perspective that presupposes conscious mental foresight of the future, its forecasting. This ability depends on the personality type. For some, ideas about the future are associated with professional choice, for others - with personal aspirations, with their future achievements; for others - with personal aspirations and needs (friendship, love, family). These differences are due to preferred areas of life, value orientations.

The term "time perspective of the future" is used by N.N. Tolstykh, who defines it as a mental projection of the motivational sphere of the individual, manifested in the form of plans, hopes, aspirations, projects, and claims, to varying degrees, that are conscious and connected with a more or less distant future [6]. In our opinion, such an interpretation of time perspective is similar in content to the term "life (or time) perspective". K.K. Platonov defines the concept of "life perspective" as "an image of one's future life that is consciously and desired as possible, subject to achieving certain goals." However, perspective is not always desirable, but often expected with anxiety and fear. Events such as failures and losses are hardly advisable to plan, but can be expected, preparing to prevent negative consequences.

E.I. Golovakha and A.A. Kronik consider time perspective to be a subjective picture of a person's life path [2]. These are certain conscious ideas of an indi-

vidual about the interrelationship of important events in his life (its logic), their duration, sequence, belonging to the past, present and future. Inter-event connections can be of two types: those with causal relationships (the preceding event is the cause of the subsequent one - the consequence) and target relationships (the subsequent event is the purpose for which the previous one occurred - the means). Also, connections between events can be realized (belonging entirely to the past), actual (passing through the current moment of the present) and potential (representing causal and target relationships between future events).

Thus, the time perspective represents a single picture of the future in a contradictory, complex relationship of programmed and expected events, on which, in the opinion of a person, his social value and the meaning of life depend.

In the course of our study among first-year students (549 people, 31% – young men, 69% – young women) one of the effective methods of psychodiagnostics of life forecasting was used – a futurological survey, which allows revealing the individual's time prospects, plans, needs and expectations from the future [5]. That is, these indicators allow studying the dynamic component of the process of planning the individual's life path.

As our research on the “Futurological Questionnaire” shows, students aged 17–20 plan their lives mainly for 1–14 days (34%), several weeks (25%), years (24%), months (22%), and less often a decade (11%). 21% of young people believe that life planning is a waste of time. The implementation of life plans by young people mainly depends on circumstances, chance, and opportunities (79%). The fact that modern youth plans their lives for micro-intervals leads us to the idea that they are building a short-term time perspective, which can be influenced by various socio-political events, in particular military events, which students did not expect in their lives. It can be assumed that modern youth tend to have a lower potential for revealing their capabilities. After all, early studies (Ya.V. Vasilyeva, V.N. Karandysheva, N.N. Tolstykh) indicate that the further into the future the goals, intentions, and expectations of the individual are placed, the greater the purposefulness, determination, stability, and consistency they impart to the activity, and the further in time the goals are outlined, the greater the potential for the disclosure of human capabilities. N.N. Tolstykh also indicated that “the emergence of a deep time perspective is an important moment in the development of individuality” [6].

But on the other hand, such a tendency to plan one's life for a short period of time makes it possible for young people to plan their future more realistically, when a person can separate reality and fantasy, and concentrate efforts on what has real grounds for realizing their goals in the future.

Students, despite the changing living conditions, plan their lives quite actively in various areas: work and career (82%), family (73%), material wealth: earn more

money, buy a car and housing (75%), study (70%), health (57%), travel (51%), sports (42%). We understand that the more saturated the time perspective with events, plans and hopes, the more intense and meaningful a person's life is. And vice versa, the fewer hopes, plans for the future and real events on the time horizon, the poorer and more meaningless life.

As for the attitude of modern youth to the past, present and future, 64% value everything that was in the past, 19% would change a lot in the past if they could; 15% believe that it cannot be returned and do not think about it; a very small part of respondents devalues the past (3%) and are indifferent to it (6%). The majority of students (82%) believe that the present is a short valuable period of time that must be lived. This understanding of time perspective may come from interpreting it as the ability of young people to act in the present in the light of foreseeing events in the relatively distant future and consciously living here and now. Very few respondents (12%) do not think about the present, even fewer (45%) indicate that the present does not matter, it quickly passes. The majority of respondents (68%) are focused on the future, they are interested in it, they are waiting for it; 22% are afraid and worried about the future, thoughts about it frighten; 11% are indifferent to the future. The optimistic expectations regarding future life plans among most students indicate a positive image of their future and a developed the ability of young people to act in the present in light of the foresight of events in the relatively distant future.

Students cite the following events as hindering their life planning: military actions (81%), illnesses (57%), family circumstances (44%), economic circumstances (30%), low motivation to achieve (27%), weakness of character and low willpower (21%).

Based on the conducted research, the following conclusions can be drawn:

1. The concept of "time perspective" has many interpretations from different authors and to date has no single definition. Time perspective is considered as a generalized vision of events in one's own life, their representation in a certain time relationship and sequence. The parameters for studying time perspective are the time frames of individual periods of life (past, present, future); the content and structure of time representations; attitude to the past, present and future; relationships between events and periods of life. Based on the scientific views discussed above, their complementary nature in the study of time perspective can be noted. We consider time perspective in the aggregate of cognitive, emotional and regulatory components.

2. There is a tendency among student youth to value the present, which must be lived, to strive for the future and the significance of past experience, which serves as the basis for the meaningfulness of their life path. Students, despite changing living conditions, plan their lives quite actively in different areas: work, family,

health, material wealth. The more saturated the time perspective with events, plans and hopes, the more intense and meaningful a person's life is.

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PSYCHOLOGICAL ASPECTS OF THE PROBLEMS OF WOMEN WITH INFERTILITY

Tliashinova Inna Alexeevna

Founder

World Quantum Company of Inna Tliashinova

Abstract. *The aim of this work is to determine the psychological characteristics of women diagnosed with infertility to improve psychological assistance for women with reproductive health disorders. A survey of 375 women was conducted electronically. All of them were united by the desire to receive psychological assistance due to the inability to become pregnant after 2 years of regular sexual intercourse. The work presents analytical information on the socio-psychological characteristics of women that should be taken into account when developing and implementing programs for psychological support for women with reproductive health disorders. The results of the work are of practical importance and can easily be implemented in programs of psychological assistance to infertile women, including those with psychological infertility.*

Keywords: *psychological characteristics, infertility, women, support programs.*

Infertility is responsible for the deterioration of demographic indicators in a number of countries. It is known that in order for the demographic situation to be in a stable state, a married couple must have at least three children. Two of them are demographic compensation for parents, and the third makes up for the natural losses and lack of children of other spouses. But the increasingly pronounced trends of declining fertility rates in a number of countries make the problem of infertility especially socially acute [1,2].

The issues of the influence of psychological problems, often considered as the causes of idiopathic infertility, such as stress, depression, sleep and eating disorders, and various types of psychological dependence, are currently of particular interest. All this explains the relevance of the ongoing research to determine the medical, socio-psychological characteristics of women diagnosed with infertility [3-4].

The purpose of this work is to determine the psychological characteristics of women diagnosed with infertility in order to improve psychological care for violations of women's reproductive health.

The following methods were used at different stages of the study: sociological, mathematical-statistical, information-analytical, bibliographic.

The survey of 375 women was conducted electronically. All of them were united by the desire to receive psychological help due to the inability to get pregnant after 2 years of regular sexual activity. During the survey, each woman gave her consent to the processing of personal data. Within the sample, they are divided into two categories – “women with psychological infertility” (the experimental group) and “other women who sought help from a psychologist on the problem of their infertility” (the main group).

The selection of a group of women with psychological infertility from the cohort of women who sought psychological help for infertility problems was carried out after providing medical certificates from attending physicians who observed a woman for infertility. These certificates, extracts from outpatient records, indicated the reasons for the diagnosis of “infertility” and indicated treatment tactics, up to a recommendation for IVF. Many of them believed that the main causes of their infertility were psychological. Thus, there were 318 women in the main group, and 57 people in the group of women with psychological infertility.

The age distribution of women showed that women with psychological infertility are more likely to seek help from a psychologist at the age of 36-43 years, their share was 57.9% compared to 43.4% of other women who sought help with infertility. However, women over the age of 44 also do not lose hope of becoming a mother. About a quarter of the women – 22.8% - who sought help and were diagnosed with psychological infertility were over the age of 44. At the same time, it should be pointed out that there is a statistically significant difference, confirmed by testing the hypothesis according to the Chi-square criterion, in age between women with psychological infertility and other women who sought help from a psychologist on infertility issues – women aged 36-43 years dominated among them, ($P < 0.1$)

The proportion of women with psychological infertility was the highest among residents of megacities with a population of over 1 million people, it was 42.1% (for other women who sought help on infertility, this figure was 39.6%); in cities with a population of 250 thousand to 1 million people, the proportion of women with psychological infertility who sought help, It was 22.8%. Consequently, the risk of psychological infertility for women living in large cities is higher than for women living in small towns and cities.

According to the results of the study, it was determined that women with psychological infertility are mainly 36-43 years old. There is a statistically significant age difference between women with psychological infertility and other women who sought help from a infertility psychologist ($P < 0.1$).

The majority of women with psychological infertility had higher education – 89.5%. About half of the women with psychological infertility were employed,

just over a third were self-employed, one in three of them (33.3%) were employed in the public sector, 2/3 of the women in this group (70.2%) worked in harmless and safe conditions.

More than half of the women with infertility lived in good conditions (59.6%), about a third lived in excellent conditions (31.6%), while their relative proportion was higher than for the rest of the women who sought help on infertility issues.

About half of the women with psychological infertility had an average level of financial security (49.1%), very high – one in ten (10.5%). In general, there is a statistically significant difference in the level of material security between the compared groups of women – in general, women with psychological infertility have a higher level of material security ($P < 0.1$).

A large proportion of women with psychological infertility were married – 84.2%, were divorced – 5.3%; 73.7% of them did not have children – were primarily infertile. Had one child – 19.3%. At the same time, among the other women who sought help on infertility issues, only 30.8% of the respondents did not have children. A statistically significant difference was revealed between the compared groups of women – women with psychological infertility are more often married and do not have any children ($P < 0.05$).

The majority of women with psychological infertility did not have abortions – 80.7%, among the rest of the women who sought help on infertility, this figure was only 53.1%. At the same time, a statistically significant difference was revealed between the compared groups of women – women with psychological infertility had fewer abortions ($P < 0.05$).

63.2% of women with psychological infertility did not have spontaneous miscarriages 1-2 spontaneous miscarriages were about a third of the respondents (29.8%). Almost all women with psychological infertility, as well as other women who sought help on infertility issues, had no premature birth, as indicated by 98.2% and 94.0% of respondents.

A large proportion of women with infertility had rare inflammatory gynecological diseases, as well as other women who sought help on infertility issues – 63.2% and 54.4%.

More than half of women with psychological infertility had a body mass index norm of 54.4% (among other women who sought help on infertility issues – 45.9%); had a body weight deficit of 14% (14.5%); excess – 15.8% (27.4%).

Less than half of the women with psychological infertility had no chronic diseases – 43.9%, just over a quarter had one chronic disease – 28.1%, two chronic diseases – 17.5%. More than a quarter of women with psychological infertility regularly undergo preventive examinations and medical examinations – 26.3% (among other women who sought help on infertility, this figure was lower and amounted to only 18.9%) and only 12.3% do not undergo preventive examinations

and medical examinations (25.2%). At the same time, a statistically significant difference was revealed between the compared groups of women – in general, women with psychological infertility monitor their health more carefully and undergo occupational examinations ($P < 0.1$).

The majority of women with psychological infertility do not smoke – 82.5% and only 3.5% smoke frequently. 36.8% of women with psychological infertility do not drink alcoholic beverages (among other women who sought help with infertility, this figure was slightly lower and amounted to 32.1%).

One in four women (25.0%) with psychological infertility had a reduced preservation of the periodicity of menstrual cycles, manifested by the fact that menstruation under the influence of adverse conditions (with neuropsychiatric experiences, in the summer or when changing their place of residence) became irregular. Among the other women who sought help on infertility issues, a similar reduced safety was determined in almost every fifth woman – 21.2%. This reflects the high prevalence of mentally sensitive and eco-sensitive individuals in the group of women with psychological infertility.

However, the proportion of women with low menstrual cycle frequency in the group with psychological infertility was lower than among the main group (15.4% vs. 24.1%), reflecting the frequent prevalence of menstrual dysfunction. Significantly more often among women with psychological infertility were those who enjoy sexual intercourse, but its achievement depends on the phase of the menstrual cycle, their share was 55.8% compared to 42.8% of other women who sought help on infertility issues. This result should be taken into account when developing programs for medical and psychological support for infertile women. It was revealed that half of women with psychological infertility (50.0%) indicated that the discharge of vaginal mucus at the beginning of sexual intercourse is either not observed or is extremely rare, depending on the phase of the menstrual cycle (in “unfavorable” periods it does not occur even with prolonged preliminary caresses), provided that the duration of preliminary caresses is sufficient Lask.

More than a third of women with psychological infertility (36.5%) noted that they had never under any circumstances experienced an orgasm or experienced isolated cases of orgasm under exceptional circumstances (sexual “games”, special forms of sexual influence when communicating with a sophisticated man) or self-arousal. Among the other women who sought help for infertility, this figure was significantly lower. The proportion of women with low sexual activity (from 1 time per year to 1 time per week) differed significantly in the comparison groups: in the group of women with psychological infertility – 36.5%, in the main group – 61.2%. These differences are statistically significant – $P \leq 0.05$ when comparing samples using the Chi-square criterion. It should be noted that the proportion of women who indicated a suboptimal duration of intercourse in the group with psy-

chological infertility was 42.3% versus 52.9% in the main group. The lower prevalence of sexual disorders in the group of women with psychological infertility is a positive prognostic factor for the restoration of reproductive function

Thus, the work provides analytical information on the socio-psychological characteristics of women, which must be taken into account when developing and implementing programs for psychological support for women with reproductive health disorders. The results of the work are of practical importance and can easily be implemented in psychological assistance programs for infertile women, including those with psychological infertility.

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THE ENGLISH IN BRITISH INDIA IN THE ASSESSMENT OF IMPERIAL HISTORIANS OF GREAT BRITAIN OF THE XIX CENTURY: MISSION AND PROBLEMS

Sidorova Tamara Anatolyevna

Doctor of Historical Science, Professor

Patrice Lumumba Peoples' Friendship University of Russia,

*Sochi Institute - branch of Patrice Lumumba Peoples' Friendship
University of Russia*

Abstract. *The article attempts to reconstruct the colonial history of British India based on the research materials of famous British historians of the imperial trend of the XIX century, who covered it from the standpoint of the concept of Anglo-Saxon exclusivity and racial superiority of the Anglo-Saxons over other peoples and created an example of an alternative truth about the colonial rule of Great Britain in India, which deformed historical reality.*

Keywords: *British India, imperial historiography of Great Britain of the XIX century, the concept of Anglo-Saxon exclusivity and racial superiority of the Anglo-Saxons, the mission and problems of the British in India, the British version of the alternative history of colonial India.*

British historians of the imperial trend of the 19th century – J.A. Froude (1818-1894), J.R. Seeley (1834-1895), C.W. Dilke (1843-1911) – created a model of Greater Britain, a huge overseas colonial empire, the commonwealth of the British “beyond the seas” and “home” (Oceana), as a single space of Anglo-Saxon domination (Saxondom), cemented by the unity of blood, language, religion, traditions. This model was based on the concept of Anglo-Saxon exclusivity and racial superiority of the Anglo-Saxons over other peoples.

The theme of the English in British India in its imperial interpretation is of interest as a vivid example of the alternative truth about British colonial rule in India, which significantly distorts historical reality, and from the point of view of modern attempts by the Anglo-Saxons to preserve and increase their hegemony in the world space.

It would not be an exaggeration to say that racism is in the blood of the British and plays a primary role in choosing allies and partners in the fight for their interests: on the principle of consanguinity, Australia, the United Kingdom and the

United States created the AUKUS alliance in 2021, aimed primarily at deterring China. It is appropriate to recall that the members of this alliance are Anglo-Saxons from former resettlement colonies.

British India, the brightest jewel in the crown of the British Empire with a population of 200-250 million people and an area of 1 million square miles [5, p. 184, 191, 198], occupied a special place in the imperial system of England. It had an insufficiently defined status of the Indian Empire, an empire within an empire, an Indian Confederation, a colony, which generally corresponded to its real situation.

In British India, the English faced a number of serious problems that needed to be not only solved, but also thoroughly comprehended. British imperial historians of the 19th century contributed to the understanding of the essence of these problems. These problems include: an explanation of the goals of the British presence in India, the problem of cognitive dissonance associated with the racial incompatibility of Anglo-Saxons and Indians, the peculiarities of conquest and governance, the importance of India as part of the empire for Great Britain, the need to preserve it as part of the empire and protect it from the encroachments of other states, the problem of mutual influence of India and England and England on India and others.

First of all, the imperial historians of Great Britain of the 19th century focused on the noble civilizational mission of the British in British India and the demonstration of their many merits. Reflecting the sovereign sentiments of the majority of compatriots in the metropolis, English historians developed the idea of the enormous historical significance of British rule in India, since “the Indian achievements of England” were “the greatest of all its achievements” [5, p. 262].

Historians diligently built the image of “noble England”, arguing that the British brought the spirit of freedom and free institutions to India, developed the Indian economy and contributed to the growth of the material well-being of Indians, ensured the absence of unrest, increased production and trade, built railways, carried out irrigation works, educated Indians in their colleges and universities and those that they created in India, rooted English as the language of science and education, thus forming a new Indian elite with a British mentality, introduced the achievements of Western science, instilled in the natives the habit of hard work, forced them to respect property and comply with laws, maintaining total control over the natives [2, vol. 2, p. 374, 87, 132, 128; 4, p.2, 4].

The English brought “good” and “benefit” to India by ending chronic and “terifying” anarchy, putting an “end to the general plunder and omnipotence of mercenary armies” and “the domination of robber states in India” based on a “system of low-level governments and high-level robbery” that had never existed in Europe [5, p. 303, 305, 274, 275].

The English have “successfully eliminated corruption” in India [5, p. 302]. They introduced elements of the English principles of democracy into the system

of government of India. Finally, the English, according to British historians, “with their own hands” created a country called “India”, which did not exist before, thanks to “railways, annexation and a policy of centralization” [1, vol. 2, p. 329, 332].

The English did a lot to rally the population of India and began to call it “the people”. Great Britain came to India not “for the sake of gaining prestige and developing trade,” but in order to “govern India in the interests of the people of Hindustan” [1, vol. 2, p. 332]. England sought to “draw India into the stream of European civilization” [5, p. 305].

Through the efforts and talent of British historians, a rosy picture of “prosperous” India in its colonial period was created [2, vol. 2, p. 121, 132; 5, p. 256], which formed a sense of pride, superiority and imperial patriotism among compatriots.

One cannot disagree with much of what British historians have written about the activities of the British conquerors in India. At the same time, attention should be paid not only to the goals they pursued, but also to the pronounced racist content and racist vocabulary permeating the works of J.A. Froude, J.R. Seeley, C.W. Dilke.

The English in British India are portrayed as “the ruling race, bringing enlightenment and civilization”, as they represent a higher European civilization, dating back to the Greco-Roman tradition [5, p.240, 261].

The history of India before the arrival of the British is depicted in exceptionally gloomy tones and negative assessments. India, from the point of view of imperial historians, was not only a civilization, but also a country: it was not a political, but a geographical concept – a continent inhabited by a “light-skinned” Aryan race (inclined to civilization), natives of Punjab, and “dark-skinned” races of “Afghans, or Pathans, Arabs, Persians, Turkmens or Tatars (barbarians)” [5, p. 222, 241; 1, vol. 2, p. 329].

The backwardness of India, which was experiencing a stage similar to the European one of the tenth century in the XVIII-XIX centuries, that is, the “medieval phase of Western civilization”, was constantly emphasized. It was claimed that India had “failed” in the civilizational sense, and if it had achieved any success, it was “a long time ago” [5, p. 243, 244].

In order to prove this statement, English historians wrote about the lack of a state, national and linguistic unity in India, about the inability of Indians to independently govern their country, about a variety of religions – Hinduism, Brahmanism, Islam, which were at war with each other [2, vol. 2, p. 96, 97, 131].

In the writings of English historians, the population of British India is pejoratively referred to as the “lower race”, “light-skinned”, “dark-skinned”, “natives”, “Bengali baboons”, “Asians” [1, vol. 2, p. 346-347, 320, 321; 2, vol. 2, p. 111, 114, 115, 116, 125; 5, p. 241].

In British India, the English constantly felt cognitive dissonance as a result of racial differences between the British and Indians. British imperial historians emphasized the alienation of the British and the indigenous peoples of India in terms of physical, intellectual and moral indicators, criteria, blood kinship, religion, language, culture, traditions, interests, geographical and climatic factors.

It follows from their works that in British India, different–vector, “unnatural” forces came into contact that could not be combined: Europeans – Asian; Christians, Brahmanists, Buddhists, Hindus and Muslims; orientation in the sphere of political interests to Europe and the New World among the British and attraction to Afghanistan, Persia and Central Asia among the climatic conditions of India, unsuitable for the life of Europeans (a climate in which, as a rule, English children cannot grow up), but favorable for the economic development of the metropolis.

Since Hindus belonged to an “alien race”, the attitude towards them and India as a source of income and well-being of the British, the exploitation of its wealth and population, were considered natural and justified [5, p. 167, 185, 11].

It should be noted that the lack of mutual understanding in British India was of a mutual nature: the Indians did not feel “gratitude” to the British, did not show “respect” and even “despised” and “hated” them, which British historians were forced to write about, however, with some clarifications [5, p. 244; 1, vol. 2, p.324).

“Hatred of the British,” according to Dilke, was not proof that they were “bad rulers” and was based on a stereotype – “Easterners always hate their masters; but Hindus will have masters.” Russian Russians, Dilke even opines that most “reasonable Hindus” would like the British to be expelled from India by the Russians, but “not because any of them think that Russians would be better rulers or kind people, but just for the pleasure of seeing their traditional oppressors defeated.” But it is precisely the civilizing mission that is allegedly “justifying our presence in India” in order to “educate the Indian peoples in the spirit of freedom” [1, vol. 2, p.326, 328].

In any case, there was no reason to assert that in British India there was an atmosphere of harmony between the conquerors and the conquered: although the natives were recognized as “fellow citizens” by the Proclamation of Queen Victoria [6], in practice they were not treated as “fellow-men” and even officers in the British service “they dare not call a native a friend” [1, vol. 2, p. 332].

British historians gradually led their readers to the idea of the need for their presence in India, which needed “masters”, in the spirit of the “burden of the white man” by R. Kipling, whose name is mentioned [1, vol. 2, p. 326; 2, vol.2, p. 93].

They put a lot of effort and talent into portraying the possession of India as a “selfless” concern for the welfare of the natives and “the labor of responsibility for managing 250 million Asians”, who lay “a huge burden ... on the neck of the nation” [5, p. 184, 185, 188, 189, 191].

A close acquaintance with the content of the works of British historians gives a different impression: India brought huge revenues to the treasury of the United Kingdom, which contributed to the economic development of England and the growth of its influence in the world; the possession of India was of great commercial, financial and political importance.

The pragmatic British, primarily representatives of the political and academic intellectual elite of Great Britain, were well aware of the benefits/benefits of owning India as a supplier of raw cotton, rice, grains, cinchona, jute, tea, coffee, tobacco, oils, indigo, fabrics, carpets, precious stones, gold, etc. Historians noted with satisfaction that in the 1880s opium, as once the largest item of Indian exports, was replaced by raw cotton, rice, cereals and tea, which reached the “opium” level of income of the British treasury and accounted for a fifth of the total exports from India. The UK received about 60-70 million pounds of direct income from India per year [2, vol. 2, p. 82-84, 88].

As a trading partner, India was on a par with the largest countries – the USA and France; and, although the share of Indian exports to England was less than from the USA and France, it was still very significant (32 million against 39 from France and at least 103 from America in 1881). India was one of the largest importers from England, and the share of its exports in 1881 amounted to 29 million pounds, while the share of exports of British goods from England to Australia and Germany amounted to 21 and 17 million pounds, respectively [5, p. 259].

In the 1880s, England’s foreign trade grew from 80 to 650 million pounds, but “the growth of Indian trade over the same period was even more significant, and since India’s foreign trade is conducted mainly with England, it follows that the trend towards a trade union between the two countries is unusually strong,” and the alliance between them will be even stronger [5, p. 261].

Commercial and financial interest in India lay at the heart of the widespread opinion in the metropolis about the need to preserve it as part of the empire: “... the loss of India would be a crushing blow to our trade,” - C.W. Dilke believed [2, vol. 2, p. 3]. J.R. Seeley argued that the loss of trade with India could result in the loss of a huge annual income of the British treasury of 60 million pounds [5, p. 191].

It was England’s commercial as well as political interest in India that made its preservation as part of the British Empire extremely significant. Because without colonies, without British India, England will turn from Great Britain into a “secluded island of the time of Elizabeth” [5, p. 306].

Without India, the English people, deprived of the “romantic interest” that the possession of India gives to their national life, would be in danger of “hopeless isolation” [2, vol. 2, p. 4].

In addition, the possession of India provided Great Britain with a leading position in the system of “Asian powers”, largely determined its foreign policy and

constant rivalry with France in the XVIII century and Russia in the XIX century. For several centuries, the fate of India has been played out on the European chess-board in the context of international politics in solving the “Eastern question” [5, p. 192, 187].

These and other examples dispel the claims of British historians about the “selflessness” of the English in British India.

Special attention should be paid to the consideration of the question of the peculiarities of the conquest of India, the interpretation of which required great effort and professional skills from British historians: they explained this issue ambiguously, inconsistently and intricately, avoiding the use of the very concept of “conquest” as much as possible. In total, this plot boils down to the following.

India was not conquered in the traditional sense, since England did not declare war on it as a state to a state; the British army did not invade the territory of India; this happened “accidentally” and “unintentionally” as a result of the trading activities of the East India Company, which led to the “transition” of India from the company after the adoption of the “Better the Government of India” in 1858 and the complete liquidation of the company in 1874 to the United Kingdom; military operations took place, but were conducted by the forces of the East India Company with partial participation of British troops; India was nevertheless conquered by “force of arms” and England kept it in obedience by deploying an army on its territory (approximately 65 thousand the British out of the total number of the British army of 200 thousand people), but a reservation was made, that this army consisted mainly of Indians (by four fifths) and was maintained at the expense of India, but England was not a “military state”; that is, India has “conquered itself”; the conquest of India was carried out by someone else’s hands, “at the expense of India itself” and did not cost England “any effort, trouble and expense”, since the English people did not have to pay special taxes on the conduct of the “Indian” war, the British government did not need to provide loans, it was not introduced in England conscription and there was no shortage of workers; England could afford to wage several wars at the same time, including with the Europeans; military operations were conducted in order to protect India from the invasion of France and were defensive, not aggressive in nature [5, p. 199, 200, 227, 191, 200, 214, 227, 202, 205, 206, 212, 213, 214, 260].

The management of British India, which was located from the metropolis at a distance of “a three-week steamer voyage”, was a big problem for the British. Historians have noted two possible options for governing India – from London or from India. C.W. Dilke considered the first one to be the most preferable, which provided for the preservation of the local bureaucracy controlled by the English parliament and, consequently, the English people. India should be “governed by the English nation from London in the interests of humanity and civilization” [1,

vol. 2, p. 330, 329]. The development of elements of representation and local government was considered appropriate, but on a moderate scale, so as to avoid direct copying of the British political system. But this was not required, because “the natives are completely different, ... they do not demand and do not understand political rights” [2, vol. 2, p. 102, 110, 111, 112].

Direct rule headed by the Empress of India, the Queen of Great Britain, the Office of Indian Affairs and the Secretary of State (Viceroy) responsible to Parliament is the best management option [2, vol. 2, p. 328]. The British government in India was highly appreciated by English historians and recognized as the best example of well-managed despotism in large cities the scale existing in the world”, the only drawback of which was “excessive centralization” [1, vol. 2, p. 332].

As a result of the analysis of the works of British historians, it can be concluded that in British India, the British demonstrated and tested combined forms of expansion – commercial, military and intellectual, elements of which they use in modern history.

Thus, the British imperial historians of the XIX century created a Eurocentric panegyric on everything British (Anglo-Saxon), which forms an alternative image of the colonial history of British India, far from historical reality, but consistent with the goals of the imperial ideology of Great Britain.

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CIRCADIAN RHYTHM OF RESPIRATORY RATE IN SEVERE COMBINED TRAUMATIC BRAIN INJURY IN CHILDREN OVER 7 YEARS OLD

Muhitdinova Hura Nuritdinovna

*Doctor of Medical Sciences, Full Professor
Center for the Development of Professional Qualifications
of Medical Workers*

Hamrayeva Gulchehra Shahobovna

*Doctor of Medical Sciences, Head of Department
Center for the Development of Professional Qualifications
of Medical Workers*

Alauatdinova Gulhan Inyatdinovna

*Assistant
Center for the Development of Professional Qualifications
of Medical Workers*

Abstract. *On the day of admission to the clinic, 4 patients from Group 1 and 9 injured children from Group 2 were transferred to mechanical ventilation according to indications. The duration of mechanical ventilation in the CMV mode was 8 days in both groups. In the following days, as spontaneous breathing was restored, children were transferred to the SIMV mode according to indications, then extubated under the control of adequate breathing restoration. Daily fluctuations occurred at a higher level by 1-2 breaths per minute in Group 2 than in Group 1. Stress-protective therapy carried out in children of Group 2 had more positive properties, allowing for more effective restoration of spontaneous breathing in more severe patients of Group 2 without the need for repeated MRP.*

Keywords: *circadian rhythm, respiration, severe combined traumatic brain injury, children.*

Relevance. *The degree of participation of the external respiratory system in compensatory mechanisms of hemodynamic restructuring, the homeostasis system as a whole in the process of adaptation in conditions of traumatic disease caused by acute traumatic brain injury against the background of a severe systemic inflammatory response of the body caused by a large array of damaged*

tissues, acute cerebral insufficiency is difficult to overestimate. Unfortunately, the most advanced respiratory support devices available in clinical practice are not able to fully provide complex functionally interconnected changes in the external parameters of the respiratory system, capable of immediately rebuilding in the constantly changing conditions of the internal environment of the body, which is in stress mobilization of defense systems under conditions of a general inflammatory reaction, aggravated by the lack of a controlling and corrective function of the brain damaged by traumatic brain injury. In this regard, given the leading compensatory significance of external respiration in ensuring adaptive changes in the homeostasis systems of the children's body, the study, development, and improvement of methods for correcting external respiration is one of the leading tasks of intensive care of critical conditions, including those caused by TBI [1-5]. In light of the above, we made an attempt to study and evaluate changes in the frequency of spontaneous breathing before transfer to mechanical ventilation, as well as after restoration of spontaneous adequate breathing after prolonged mechanical ventilation in school-age children with TBI.

Objective of the work. To study the features of the circadian rhythm of the respiratory rate in severe combined traumatic brain injury in children over 7 years old.

Material and methods of the study. The study included 20 children aged 7.1 to 18 years. Upon admission to the intensive care unit, the victims underwent a set of diagnostic procedures, biochemical blood composition and general analysis, blood clotting potential was studied, chest X-ray and existing bone fracture zones were performed as indicated, and all victims underwent computed tomography of the head. The InjurySeverityScore (ISS) scale was used to assess the severity of the injury. The resulting value (from 1 to 75 points) in digital form shows the severity of the injury. The ISS scale has become the most widely used abroad and is an anatomical standard for injury severity [Demetriades D. et al., 1995; Osier T. et al., 1997; Oestern H.-J., 1997; Tatic M. et al., 2000; Wagner A. K. et al., 2000]. Non-invasive continuous monitoring with hourly recording of indicators, carried out in the intensive care unit, consisted of measuring blood pressure, OVT, blood oxygen saturation, heart rate (HR), respiratory rate (RR), myocardial oxygen demand (MOD).

For the period 2018-2022, the components of intensive complex therapy were studied in 10 children (group 1) aged 7.1-18 years. A comparative analysis was carried out with a group of 10 children identical in diagnosis, age, severity of condition for 2023-24 (group 2). No significant differences in age, gender, duration of hospital treatment, duration of intensive care in the ICU were found. Comparative data on the volume of drug correction in the first 10 days of treatment revealed a significantly greater use of painkillers. Thus, if in group 1 fentanyl was adminis-

tered at the rate of 13.9 ± 5.8 mcg/kg per day, then in group 2 it was almost 4 times more 52.6 ± 20.9 ($p < 0.05$). Profol in group 1 was administered at an average dose of 0.9 ± 0.7 mg/kg/day, and in group 2 the daily dose of administered profol was 26.7 ± 8.4 mg/kg per day (188% more than in group 1). Arduan in group 1 was administered at the rate of 9.0 ± 3.6 mg/kg per day, in group 2 – almost twice as much (16.8 ± 5.6 mg/kg per day). It should be noted that in group 1, due to the short duration of action of the administered drug, GHB 100-150 mg/kg, midazolam, siba-zone, and barbiturates were administered liberally. Thus, attention was drawn to the fact that with comparatively large traumatic injuries, volume of damage, severity of TBI in dynamics, stress-limiting therapy with prolonged administration of the above-mentioned drugs during the day was significantly increased in Group 2. Due to the severity of TBI, the duration of mechanical respiratory support (MRS) in the CMV mode in 1 patient and the SIMV mode in 1 patient in Group 2 was more than 29 days (Fig. 1, 2).

Results and their discussion. No significant differences in the parameters of the phase structure of the circadian rhythm of respiratory rate in the studied groups were revealed (Table 1).

Table 1.
Average parameters of the phase structure of the circadian rhythm of respiratory rate per minute

Groups	Mesor	In acrophase	In the bathyphase	Amplitude	Daily range
1	23 ± 2	26 ± 3	21 ± 2	2 ± 1	4 ± 2
2	25 ± 3	27 ± 4	22 ± 2	3 ± 2	5 ± 2

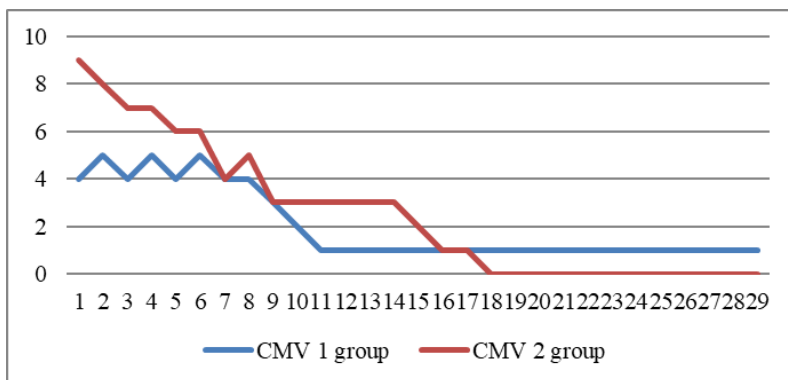


Figure 1. *Patients on artificial ventilation*

On the day of admission to the clinic, 4 patients of group 1 and 9 injured children of group 2 were transferred to artificial ventilation according to indications. The duration of artificial ventilation in the CMV mode was 8 days in both groups (Fig. 1). In the following days, as spontaneous breathing was restored, children were transferred to the SIMV mode according to indications, then extubated under the control of restoration of adequate breathing, reflexes, consciousness according to existing protocols for the management of patients with severe traumatic brain injury, traumatic disease on artificial ventilation (Fig. 3).

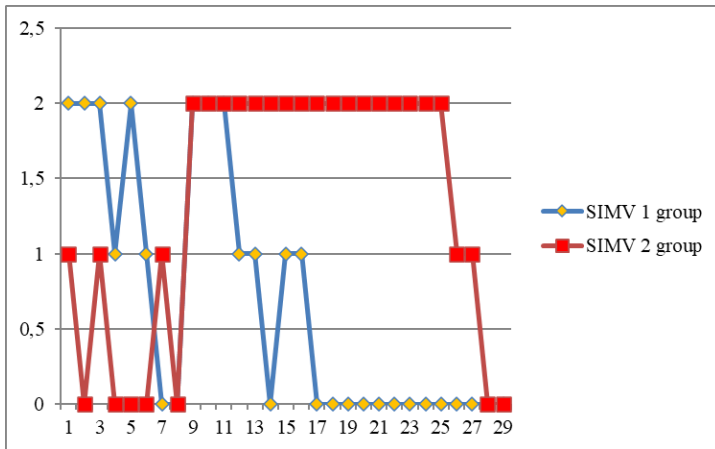


Figure 2. Number of patients by days with MRS in SIMV

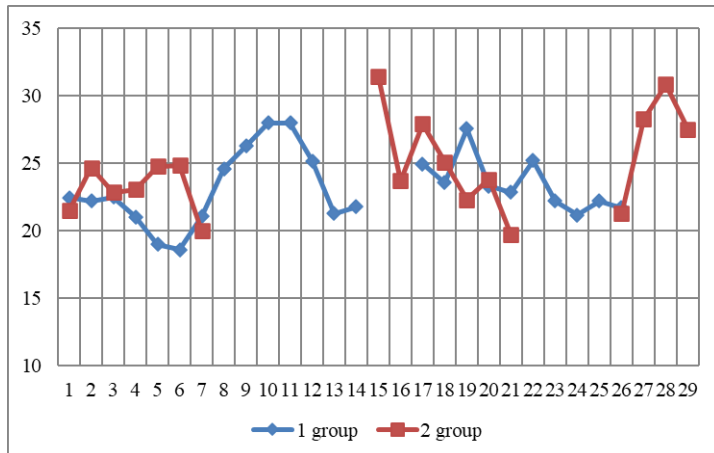


Figure 3. Dynamics of the mesocircular rhythm of the respiratory rate

As can be seen from the data presented in Fig. 3, on days 14-17 all injured patients of group 1 were on MRS. In group 2, all patients remaining in the ICU were given artificial ventilation/intact mechanical ventilation until day 15 (Fig. 3).

Table 2.

Dynamics of the mesor of the circadian rhythm of the respiratory rate

Days	1 group	2 group
1	22±1	22±1
2	22±2	25±1
3	22±0,3	23±1
4	21±1	23±1
5	19±1	25±1
6	19±0,2	25
7	21±1	20
8	25±1	мрп
9	26	мрп
10	28±1	мрп
11	28±1	мрп
12	25±2	Мрп
13	21±1	мрп
14	22±1	мрп
15	мрп	31±1
16	мрп	24±1
17	25±1	28±1
18	24±1	25±1
19	28±1	22±1
20	23±1	24±1
21	23±1	20±1
22	25±2	Мрп
23	22±1	Мрп
24	21±1	Мрп
25	22	мрп
26	22±1	21±1
27	Мрп	28±3
28	Мрп	31±2
29	мрп	28±1

Table 3.*Average circadian rhythm of respiratory rate*

Hours	1 group	2 group
8	24±2	25±2
9	24±2	25±3
10	24±2	25±3
11	24±2	25±2
12	23±2	25±3
13	23±2	25±3
14	23±2	24±3
15	23±2	25±2
16	23±2	25±3
17	23±2	25±2
18	23±2	25±2
19	23±2	25±3
20	23±2	25±3
21	23±2	25±3
22	23±2	25±3
23	23±2	25±4
24	23±2	25±3
1	23±2	25±3
2	23±2	25±2
3	23±2	25±3
4	23±2	26±3
5	23±2	25±2
6	23±2	26±3
7	23±3	26±3

As shown in Table 2, no significant differences were found depending on the severity of the condition or drug correction. Analysis of the dynamics of the indicator in terms of studying changes in the average values of the circadian rhythm of the respiratory rate allowed us to state that the projection of the acrophase of the circadian rhythm of the respiratory rate in Group 1 corresponded to the norm (9 a.m.), while in Group 2 a shift in the acrophase of the circadian rhythm of the respiratory rate by 4 a.m. (inversion) was detected. Daily fluctuations occurred at a higher level by 1-2 breaths per minute in Group 2 than in Group 1 (Fig. 4).

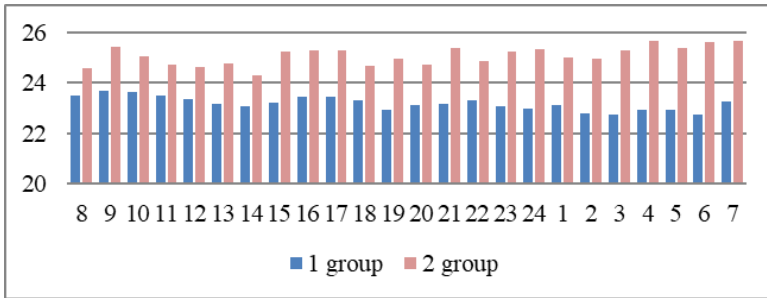


Figure 4. Average circadian rhythm of respiratory rate

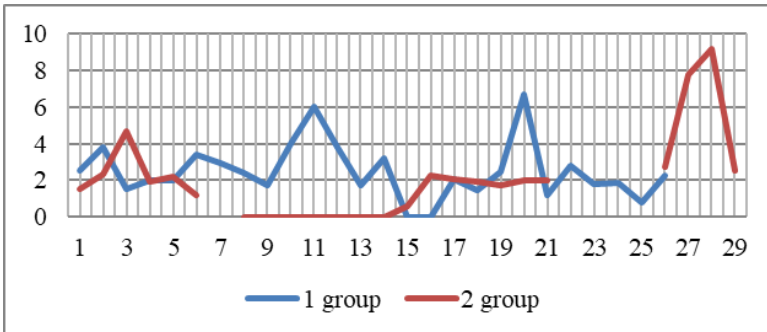


Figure 5. Amplitude of the circadian rhythm of spontaneous breathing (RR per minute)

The amplitude, daily fluctuations of RR in the circadian rhythm were characterized by instability, amounting to 6 per minute on the 11th day in group 1, 5 - on the 3rd day in group 2 (Fig. 5). It seems that stress-protective therapy carried out in children of group 2 had more positive properties, allowing for a more effective, successful (without the need for repeated MRS) restoration of spontaneous breathing in more severe patients of group 2 (Fig. 6).

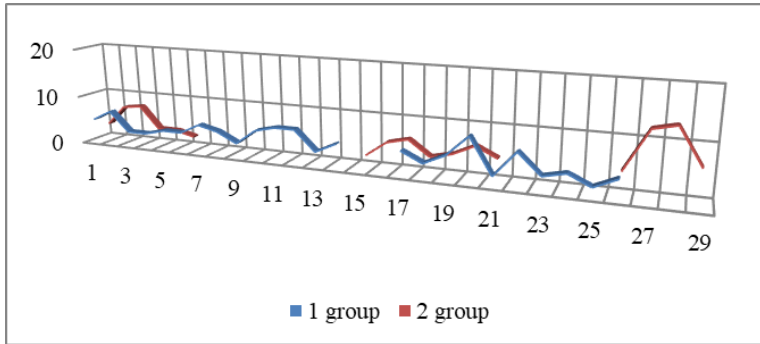


Figure 6. Daily fluctuations in spontaneous respiratory rate per minute.

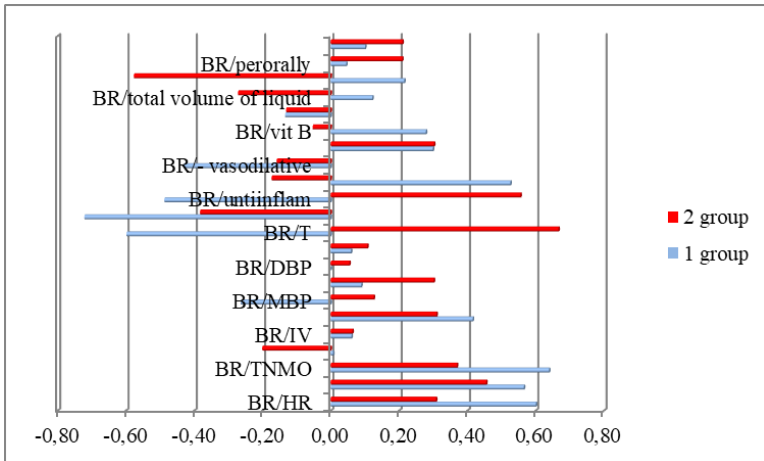


Figure 7. Correlation relationships of RR.

In group 1, there was a tendency to form a direct dependence of HR on RR (0.6), while this relationship was significantly weakened in group 2 (0.31). The tendency to restore vegetative regulation was also more pronounced in group 1 (0.57) than in group 2 (0.46). At the same time, in group 1, there was a tendency to compensatory increase in respiratory rate with an increase in MVP (0.64), and in group 2, a decrease in this relationship (0.37) was understood as a more effective protective sedative drug correction for myocardial trophism, i.e. prevention of myocardial hypoxia (Fig. 7). Suppression of the respiratory center function was expressed in a negative reliable relationship between RR and sedative therapy (-0.72) in group 1, which decreased in group 2 (-0.38). A positive effect of paren-

teral infusion therapy on respiratory rate was revealed in group 2 (-0.58), which was absent in group 1 (0.22). An increase in body temperature in group 1 showed a tendency to decrease respiratory rate (-0.6), while in group 2 the hyperthermic reaction was accompanied by a physiological increase in respiratory rate (0.67). That is, in the more severe group, the tendency to form a compensatory reaction to hyperthermia persisted.

The duration of inversion was longer in children of group 2, amounting to 41% of the duration of intensive care in the ICU, while in group 1 it was 20%. The findings characterize the adaptive restructuring of the circadian rhythm of respiratory rate in a comparatively more severe condition of children in group 2 (Fig. 8).

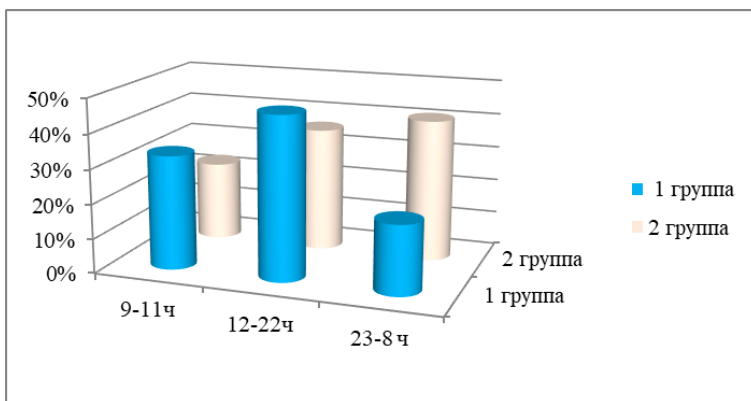


Figure 8. Duration of circadian rhythm inversion of respiratory rate in %.

Conclusion. On the day of admission to the clinic, 4 patients of group 1 and 9 injured children of group 2 were transferred to artificial ventilation according to indications. The duration of artificial ventilation in the CMV mode was 8 days in both groups. In the following days, as spontaneous breathing was restored, children were transferred to the SIMV mode according to indications, then extubated under the control of adequate breathing restoration. Daily fluctuations occurred at a higher level by 1-2 breaths per minute in group 2 than in group 1. Stress-protective therapy carried out in children of group 2 had more positive properties, allowing for more effective restoration of spontaneous breathing in more severe patients of group 2 without the need for repeated MRS.

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THE EFFECT OF SEDATIVE THERAPY ON THE CIRCADIAN RHYTHM OF OXYGEN SATURATION IN SEVERE COMBINED TRAUMATIC BRAIN INJURY IN CHILDREN OVER 7 YEARS OLD

Muhitdinova Hura Nuritdinovna

*Doctor of Medical Sciences, Full Professor
Center for the Development of Professional Qualifications
of Medical Workers*

Hamrayeva Gulchehra Shahobovna

*Doctor of Medical Sciences, Head of Department
Center for the Development of Professional Qualifications
of Medical Workers*

Alauatdinova Gulhan Inyatdinovna

*Assistant
Center for the Development of Professional Qualifications
of Medical Workers*

Abstract. *In the absence of significant differences in the phase structure of the circadian rhythm of the oxygen saturation index in the studied groups, it was revealed that the bathyphase index of the circadian rhythm of the oxygen saturation index was more sensitive to the stress response of the adaptive mechanisms of the respiratory system.*

Changes in the values of the amplitude and daily range of the circadian rhythm of the oxygen saturation index in all patients fit into the circadian, circadian biorhythms, but were represented in group 2 by higher-amplitude oscillations, corresponding to more severe cranial and extracranial injuries. A tendency toward a direct dependence of central and peripheral hemodynamics on the oxygen saturation index was revealed in group 1. A positively directed tendency of the oxygen saturation index dynamics to increase with an increase in the daily volume of fluid administration (0.73), mainly by the enteral route (0.7) was noted. While in the 2nd group of children, the increase in blood oxygenation was promoted by parenteral administration of solutions (0.73) and, to a lesser extent, protein preparations (0.46).

Keywords: *sedative therapy, circadian rhythm, oxygen saturation, severe combined traumatic brain injury, children.*

Relevance. Saturation is a parameter showing the level of oxygen as a percentage. It enters the bloodstream from the lungs and is transported to all body systems. If the indicator is lower, this indicates a lack of oxygen - hypoxemia with a high probability due to damage to the respiratory organs. The norm for the normal functioning of the lungs and other organs is considered to be a saturation indicator of 100%. At night, the indicator decreases, and the difference with the norm can be impressive. The peak of the decrease occurs between three in the morning and seven in the morning. This is the most dangerous time for those who fall ill - the greatest number of deaths are recorded during this period. However, there is insufficient information in the literature on the dynamics of the circadian rhythm of oxygen saturation in children, changes in the indicator depending on the severity of injury and stress-protective therapy, which served as the basis for this study [1-5].

Objective. To study the effect of sedative therapy on the circadian rhythm of oxygen saturation in severe combined traumatic brain injury in children over 7 years old.

Material and methods. The study included 20 children aged 7.1 to 18 years. The InjurySeverityScore (ISS) scale was used to assess the severity of injury. The resulting value (from 1 to 75 points) in a digital value shows the severity of the injury. Non-invasive continuous monitoring with hourly recording of indicators, carried out in the intensive care unit, consisted of measuring blood pressure, blood saturation, heart rate (HR), respiratory rate (RR), myocardial oxygen demand (MOD).

For the period 2018-2022, the components of intensive complex therapy were studied in 10 children (Group 1) aged 7.1-18 years. A comparative analysis was carried out with a group of 10 children identical in diagnosis, age, and severity of the condition for 2023-24 (Group 2). No significant differences in age, gender, duration of hospital treatment, or duration of intensive care in the ICU were found. Comparative data on the volume of drug correction in the first 10 days of treatment in Group 2 revealed a significantly higher use of painkillers. Thus, if in Group 1 fentanyl was administered 13.9 ± 5.8 mcg/kg per day, then in Group 2 it was almost 4 times more 52.6 ± 20.9 ($p < 0.05$). In group 1, Profol was administered at an average dose of 0.9 ± 0.7 mg/kg/day, and in group 2, the daily dose of Profol administered was 26.7 ± 8.4 mg/kg per day (188% more than in group 1). Arduan was administered in group 1 at 9.0 ± 3.6 mg/kg per day, in group 2 – almost twice as much (16.8 ± 5.6 mg/kg per day). It should be noted that in group 1, due to the short duration of the sedative effect of the administered drug, 100-150 mg/kg GHB, midazolam, sibazon, and barbiturates were administered as a bolus. Thus, the fact that with comparatively large traumatic injury, volume of damage, severity of TBI in dynamics, stress-limiting therapy with prolonged administration of the above-mentioned drugs during the day was significantly increased in group 2,

creating a virtually constant concentration of the administered drugs in the blood was noteworthy. Due to the severity of TBI, the duration of mechanical respiratory support (MRS) was carried out in the CMV mode in 1 patient and in the SIMV mode in 1 patient in group 2 for more than 29 days (Fig. 1, 2).

Results and their discussion. No significant differences in the parameters of the phase structure of the circadian rhythm of the oxygen saturation index were found in the studied groups (Table 1).

Table 1.
Average parameters of the phase structure of the cicada rhythm of oxygen saturation in %.

Groups	Mesor	In acrophase	In the bathyphase	Amplitude	Daily range
1	98,3±0,2	98,9±0,2	97,4±0,4	0,6±0,2	1,6±0,4
2	98,5±0,4	99,2±0,3	97,6±0,6	0,7±0,2	1,6±0,5

Table 2.
Dynamics of the mesoscopic circadian rhythm of oxygen saturation

Days	1 group	2 group
1	98,0±0,7	98,8±0,6
2	98,5±0,2	98,8±0,2
3	98,2±0,4	98,2±0,3
4	98,6±0,3	97,8±0,3
5	98,2±0,3	97,7±0,3
6	98,5±0,3	98,4±0,2
7	98,2±0,4	98,9±0,2
8	98,6±0,2	98,8±0,1
9	98,4±0,4	98,9±0,2
10	98,3±0,4	99,1±0,2
11	98,2±0,2	98,7±0,2
12	97,9±0,4	98,6±0,3
13	97,8±0,5	98,6±0,3
14	98,7±0,3	98,8±0,2
15	98,3±0,3	98,1±0,3
16	98,9±0,2	98,5±0,4
17	98,8±0,3	98,0±0,4
18	98,3±0,6	97,9±0,3
19	98,0±0,4	98,3±0,2
20	97,8±0,3	98,4±0,3
21	98,1±0,4	99,2±0,3
22	98,4±0,2	99,0±0,1

23	97,7±0,2	99,2±0,4
24	98,3±0,3	98,4±0,6
25	98,4±0,4	98,5±0,4
26	98,3±0,4	98,2±0,5
27	98,3±0,5	98,5±0,3
28	98,5±0,5	98,4±0,6
29	98,7±0,4	97,5±0,5

Table 3.*Average circadian rhythm of oxygen saturation*

Hours	1 group	2 group
8	98,1±0,6	98,5±0,3
9	98,2±0,4	98,5±0,4
10	98,3±0,4	98,3±0,5
11	98,2±0,3	98,3±0,5
12	98,2±0,5	98,5±0,5
13	98,3±0,4	98,4±0,6
14	98,4±0,4	98,4±0,6
15	98,5±0,4	98,4±0,5
16	98,3±0,5	98,5±0,5
17	98,3±0,5	98,4±0,4
18	98,1±0,6	98,5±0,6
19	98,4±0,4	98,7±0,4
20	98,4±0,5	98,6±0,5
21	98,4±0,4	98,5±0,5
22	98,3±0,4	98,5±0,5
23	98,4±0,4	98,5±0,5
24	98,3±0,4	98,6±0,5
1	98,4±0,5	98,5±0,5
2	98,3±0,3	98,6±0,4
3	98,3±0,4	98,6±0,5
4	98,3±0,4	98,5±0,4
5	98,3±0,4	98,5±0,5
6	98,4±0,4	98,6±0,4
7	98,4±0,4	98,6±0,4

Throughout the observation period, intensive therapy, including MRS, allowed avoiding a significant decrease in the circadian rhythm of oxygen saturation and maintaining the level above 94% in all patients (Tables 2, 3). However, there was a tendency for the oxygen saturation index to increase in Group 2 on days 7-10, after

decreasing to 97.6% on day 5. Perhaps, the identified feature is a reflection of the bathyphase of the weekly rhythm of oxygen saturation (Fig. 1). The average circadian rhythm of oxygen saturation was represented by fluctuations of the average daily indicator at the level of 98-99% in both groups with a shift of acrophase in group 1 to 3 p.m., bathyphase to 8 a.m., in group 2 a shift of acrophase to 7 p.m., bathyphase to 11 a.m., which indicated a predominant shift of the minimum oxygen saturation indicators to the morning hours with a norm of 0-2 hours of the dark period of the day (Fig. 2). That is, the bathyphase indicator turned out to be more sensitive to the stress reaction of the adaptive mechanisms of the respiratory system. Perhaps, the identified features are associated with more active intervention in corrective manipulations, such as the predominance of the volume of infusion therapy in the morning hours, sanitation of the tracheobronchial tree, a trial short-term change in the ventilation mode by the attending physician, etc.

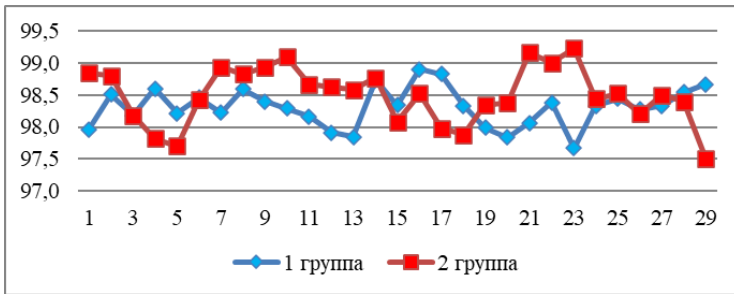


Figure 1. Dynamics of the mesoscopic circadian rhythm of oxygen saturation in %.

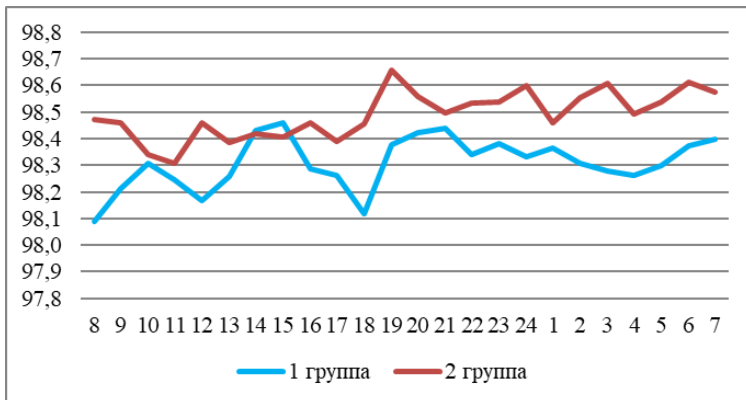


Figure 2. Average circadian rhythm of oxygen saturation index in %.



Figure 3. Dynamics of the amplitude of the circadian rhythm of oxygen saturation in %.

Changes in the values of the amplitude and daily range of the circadian rhythm of the oxygen saturation index in all patients fit into the weekly biorhythms, but were represented in group 2 by higher-amplitude fluctuations, fully corresponding to more severe cranial and extracranial injuries (Fig. 3).

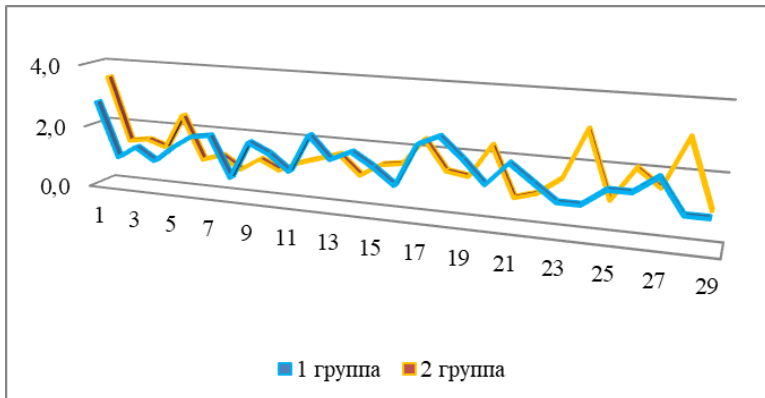


Figure 4. Daily range of oxygen saturation fluctuations in %

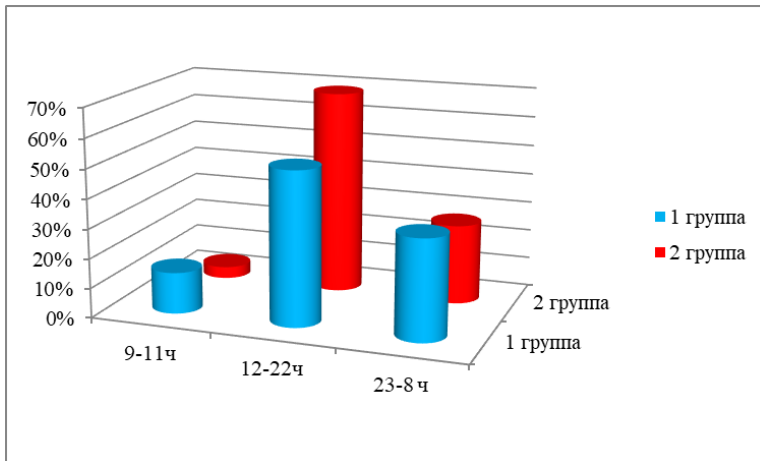


Figure 5. Duration of the shift of the peak of the acrophase of the circadian rhythm of oxygen saturation in %

A tendency towards the predominance of the duration of the inversion of the circadian rhythm of oxygen saturation in injured children of group 1 (34%) was noted with the duration of the maximum shift of the peak of the acrophase of the circadian rhythm of oxygen saturation over 27% of the duration of intensive care in the ICU (Fig. 5).

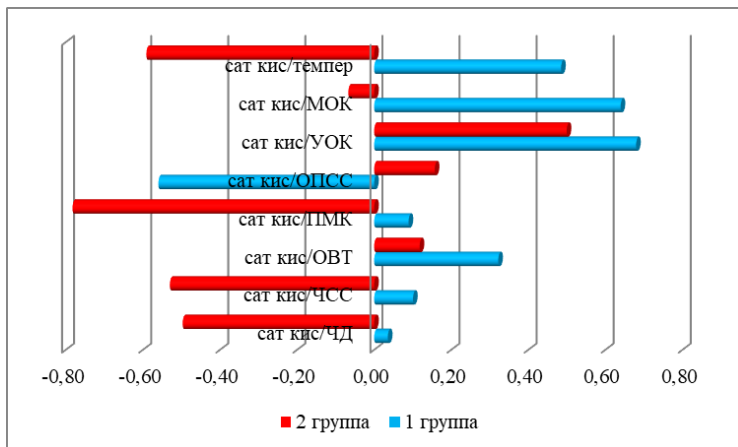


Figure 6. Correlation relationships between oxygen saturation and hemodynamic parameters

A tendency was revealed for the dependence of the blood oxygen saturation level on RR (-0.5), HR (-0.53), as well as an inverse dependence of PMC on the oxygen saturation index (-0.78) and on changes in body temperature (-0.59) in children of group 2. In contrast to the features found in group 1 of injured children, a tendency toward a direct correlation relationship between oxygen saturation and SV (0.68), as well as CO (0.64) and an inverse correlation relationship between the index and TPR (-0.56) was found. The correlation relationships found characterized a tendency toward a direct dependence of central and peripheral hemodynamics on the oxygen saturation index in group 1 (Fig. 6). That is, the increase in the level of oxygen saturation in the blood supported the tendency to form a hyperdynamic type of hemodynamics in children of group 1, which is characterized as a stress reaction of the circulatory system to injury. The positively directed tendency of the dynamics of the oxygen saturation indicator to increase with an increase in the daily volume of fluid administration (0.73), mainly by the enteral route (0.7), is noteworthy. While in group 2 children, the growth of blood oxygenation was facilitated by parenteral administration of solutions (0.73) and, to a lesser extent, protein preparations (0.46) (Fig. 7).

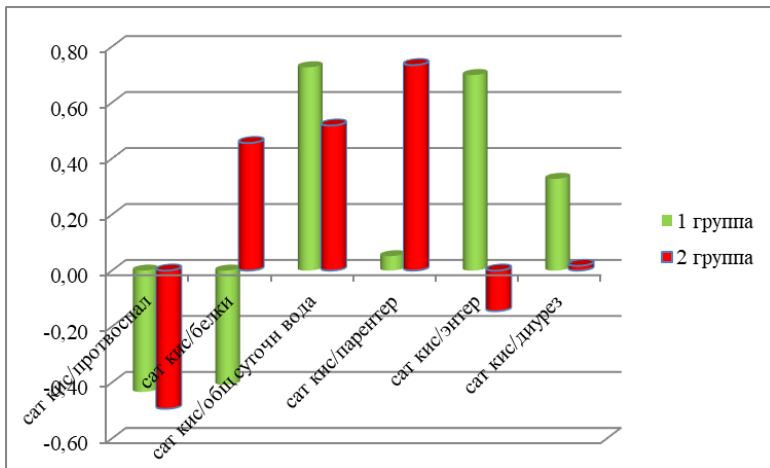


Figure 7. Correlation links of oxygen saturation and treatment

Conclusion. In the absence of significant differences in the average indices of the phase structure of the circadian rhythm of the oxygen saturation index in the studied groups, it was revealed that the index of the circadian rhythm bathyphase of the oxygen saturation index was more sensitive to the stress response of the adaptive mechanisms of the respiratory system.

Changes in the values of the amplitude and daily range of the circadian rhythm of the oxygen saturation index in all patients fit into the circadian and circadian biorhythms, but were presented in group 2 by higher-amplitude oscillations, quite corresponding to more severe cranial and extracranial injuries. A tendency toward a direct dependence of central and peripheral hemodynamics on the oxygen saturation index was revealed in group 1. A positively directed tendency of the oxygen saturation index dynamics to increase with an increase in the daily volume of fluid administration (0.73), mainly by the enteral route (0.7) was noted. While in the 2nd group of children, the increase in blood oxygenation was facilitated by parenteral administration of solutions (0.73) and, to a lesser extent, protein preparations (0.46).

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THE INFLUENCE OF SEVERITY OF SEVERE COMBINED TRAUMATIC BRAIN INJURY ON THE CIRCADIAN RHYTHM OF HEART RATE AND CIRCADIAN INDEX IN CHILDREN

Muhitdinova Hura Nuritdinovna

Doctor of Medical Sciences, Full Professor

*Center for the Development of Professional Qualifications
of Medical Workers*

Hamrayeva Gulchehra Shahobovna

Doctor of Medical Sciences, Head of Department

*Center for the Development of Professional Qualifications
of Medical Workers*

Alauatdinova Gulhan Inyatdinovna

Assistant

*Center for the Development of Professional Qualifications
of Medical Workers*

Abstract. *On the first day of admission to the clinic, as well as on the following days of observation, no significant differences in the dynamics of changes in the mesorum of the circadian rhythm of the heart rate were found in both groups. Despite the severity of the condition, acute cerebral insufficiency, which was 7 points according to the Glasgow scale in children of the 2nd group, the functional activity of the heart pacemaker continued in a circadian, about-weekly rhythm, which, apparently, should be considered a favorable sign of reversibility of the structures of vital centers even against the background of a fairly deep drug stress-limiting load after SCTBI. At first glance, these studies indicated the effectiveness of the stress-protective therapy. The identified persistent downward deviation of the CI indicator allows us to say that the contractility of the myocardium has decreased, and the patients have developed irreversible changes in the myocardium, a high risk of chronic heart failure has appeared. Against the background of a fairly massive stress-protective therapy, the children of group 2 retained compensatory activity of the heart rhythm driver, which could, if necessary, provide an increase in oxygen delivery to tissues in critical disorders, hypoxia through an increase in the CO indicator (0.7). This compensation mechanism in group 1 was at a*

lower level (0.4). In group 2, a positive effect on the heart rhythm of increased detoxification therapy was observed.

Keywords: severe combined traumatic brain injury, circadian rhythm of heart rate, circadian index, children.

Relevance. One of the leading pathogenetic mechanisms of ARF development is a hypersympathotonic reaction causing spasm of peripheral vessels, including renal vessels, ensuring adequacy of compensatory centralization of blood circulation in conditions of dehydration (hypovolemia) and other stress reactions of the body. In healthy people, a certain cyclicity is observed in the work of the circulatory system: the heart beats more often during the day than at night. One of the objective indicators of physiological cyclicity is the circadian index (CI). The calculation is made using the formula: $CI = \text{Average HR during the day (from 7.00 to 22.00)} / \text{Average HR at night (from 23.00 to 7.00)}$ The indicator is not affected by either the age or the gender of the subject. The exception is children under 1 year old: due to the physiological peculiarities, the CI of an infant may be slightly lower and averages 1.15. In practical medicine, deviations of this index both upward and downward are observed. The value of CI within 1.24 -1.44 conventional units ($M 1.32 + 0.06$) is an indicator of stable vegetative organization of the daily heart rhythm. With a persistent downward deviation of the indicator, it can be said that the contractility of the myocardium has decreased, and the patient has developed irreversible changes in the myocardium and chronic heart failure. A decrease in CI less than 1.2 is observed in diseases associated with vegetative “denervation” of the heart and is associated with a poor prognosis and a high risk of sudden death in patients at risk. However, the literature does not contain enough information on the dynamics of CI in the acute phase of TSCI in children, which served as the basis for this study [1-6]. Purpose of the work. To study the effect of the severity of severe combined traumatic brain injury on the circadian rhythm of the heart rate and the circadian index in children over 7 years old. Material and methods of the study. The study included 20 children aged 7.1 to 18 years who were treated in the intensive care unit. Upon admission to the intensive care unit, the victims underwent a set of diagnostic measures, biochemical blood composition and general blood analysis, the coagulation potential of the blood was studied, chest X-rays and existing bone fracture zones were performed if indicated, and all victims underwent computed tomography of the head. The InjurySeverityScore (ISS) scale was used to assess the severity of the injury. The resulting value (from 1 to 75 points) in a digital value shows the severity of the injury. For the period 2018-2022, the components of intensive complex therapy were studied in 10 children (group 1) aged 7.1-18 years in the first 10 days of intensive care in the intensive care unit. A comparative analysis was conducted with 10 children with identical

diagnosis, age, and severity of condition in 2023-24 (Group 2). No significant differences were found in age, gender, duration of hospital treatment, or duration of intensive care in the ICU.

Comparative data on the volume of drug correction in the first 10 days of treatment revealed a significantly higher use of painkillers in Group 2. It was noteworthy that with comparatively large traumatic injuries, volume of damage, and severity of TBI in dynamics, stress-limiting therapy was significantly increased in Group 2. The research data were processed by the method of variation statistics using the Excel program by calculating the arithmetic mean values (M) and errors of means (m). To assess the reliability of differences in two values, the parametric Student's criterion (t) was used. The relationship between the dynamics of the studied parameters was determined by the method of paired correlations. The critical level of significance was taken to be equal to 0.05. Results and discussion. The severity of injury according to the ISS scale was 23.1 ± 5.72 points in group 1 and 29.8 ± 4.0 points in group 2. Acute cerebral insufficiency corresponded to 9.7 ± 1.56 points according to the Glasgow scale in group 1 and 7.4 ± 1.4 points in group 2. A tendency towards comparatively more severe injuries (according to the ISS scale – 29.8 ± 6.0 points) and SCTBI (according to the Glasgow scale 7.4 ± 1.4) was revealed in children of group 2. However, no significant differences were found in the values of average parameters of the phase structure (mesor, HR values in acrophase, bathyphase, amplitude, daily range of HR oscillations) of the circadian rhythm of HR in the groups in both groups (Table 1). At first glance, these studies indicated the effectiveness of the stress-protective therapy. A more in-depth study of the dynamics of the circadian rhythm of the heart rate allowed us to identify some features of deviations that characterize the insufficiency of corrective measures.

Table 1

Average values of the parameters of the phase structure of the circadian rhythm of the heart rate per minute

Groups	Mesor	In acrophase	In the bathyphase	Amplitude	Daily range
1	97 ± 7	107 ± 7	88 ± 8	10 ± 3	19 ± 5
2	98 ± 7	110 ± 6	86 ± 9	12 ± 5	24 ± 9

Table 2

Mesozoic circadian rhythm of heart rate

Days	1 group	Days
1	106 ± 7	107 ± 7
2	109 ± 4	109 ± 4
3	106 ± 3	109 ± 2

4	102±4	108±2
5	98±4	102±5
6	99±2	96±3
7	102±2	91±4*
8	110±2	90±3*
9	100±4	94±4
10	109±3	94±8*
11	108±3	98±4*
12	103±4	105±3
13	89±4	106±6
14	92±3	101±3
15	102±5	107±3
16	98±4	106±3
17	96±3	99±4
18	95±5	103±4
19	101±8	97±7
20	90±4	88±6
21	91±4	83±9
22	109±6	92±9
23	100±4	96±11
24	82±5	85±8
25	79±4	103±10
26	85±3	103±5
27	88±4	88±7
28	92±4	106±8
29	87±6	89±6

Table 3
Average circadian rhythm

Hours	1 group	2 group
8	99±8	102±8
9	99±7	102±8
10	101±8	99±9
11	100±8	102±7
12	100±7	101±8
13	100±9	100±8
14	99±8	102±7
15	98±9	101±8
16	100±9	100±8

17	100±8	100±7
18	99±8	100±8
19	97±7	100±8
20	96±8	101±9
21	98±8	99±7
22	97±7	98±7
23	96±8	97±8
24	94±9	96±9
1	96±8	96±9
2	95±8	94±10
3	95±8	93±10
4	93±8	94±10
5	94±8	94±9
6	97±7	93±8
7	98±8	97±7

Table 4
Dynamics of the circadian index

Days	Average daily heart rate		Average night heart rate		CI	
	1 gr	2 gr	1 gr	2 gr	1 gr	2 gr
1	102±6	100±5	111±5	114±4	0,9	0,9
2	112±3	111±4	106±2	105±2	1,1	1,1
3	108±2	109±2	103±1	107±2	1,1	1,0
4	104±3	109±1	98±3	107±2	1,1	1,0
5	100±3	106±4	95±2	98±2	1,1	1,1
6	100±2	97±3	98±2	94±2	1,0	1,0
7	102±2	91±4	101±2	91±4	1,0	1,0
8	111±2	91±2	109±2	88±4	1,0	1,0
9	102±4	92±4	98±3	96±4	1,0	1,0
10	110±4	99±5	109±2	87±5	1,0	1,1
11	109±3	100±3	105±3	96±2	1,0	1,1
12	106±2	107±3	99±3	102±2	1,1	1,1
13	91±4	107±6	87±3	105±6	1,0	1,0
14	93±3	101±4	89±2	101±2	1,0	1,0
15	103±5	107±3	100±4	106±4	1,0	1,0
16	98±3	107±3	96±5	103±3	1,0	1,0
17	96±2	97±4	97±3	102±3	1,0	1,0
18	94±5	106±3	95±5	98±3	1,0	1,1
19	107±3	103±4	92±3	89±4	1,2	1,2
20	88±3	93±2	92±5	82±4	1,0	1,1

21	94±4	91±8	87±2	74±6	1,1	1,2
22	113±4	90±11	104±4	94±6	1,1	0,9
23	102±3	105±4	97±3	84±5	1,1	1,2
24	85±5	84±7	78±4	88±9	1,1	1,0
25	81±3	112±3	77±4	92±7	1,0	1,2
26	84±3	106±4	85±3	98±2	1,0	1,1
27	89±3	93±4	87±5	81±7	1,0	1,1
28	95±2	112±5	88±4	98±8	1,1	1,1
29	90±5	94±4	82±5	83±3	1,1	1,1

On the first day of admission to the clinic, as well as on the following days of observation (Table 2), no significant differences in the dynamics of changes in the mesomorph of the circadian rhythm of the heart rate were found in both groups. Only on the 7th, 8th, 10th, 11th days, the patients of the 2nd group showed significantly lower values than in the 1st group of the mesomorph of the circadian rhythm of the heart rate by 10%, 18%, 13%, 9% ($p < 0.05$, respectively). Changes in the dynamics of the heart rate were oscillatory in nature with the period of oscillation in the 1st group being 7, 4, 5, 6, 7 days. Oscillations of the mesomorph of the circadian rhythm of the heart rate in the 2nd group were distinguished by an increase in the period of oscillation of the circadian rhythm to 10 days, three three-four-day oscillations on the 10-21st days constituted the second wave 11 days long. Despite the severity of the condition, acute cerebral insufficiency, which amounted to 7 points on the Glasgow scale in children of group 2, the functional activity of the cardiac pacemaker continued in a cicada, about-weekly rhythm, which, apparently, should be considered a favorable sign of reversibility of the structures of vital centers even against the background of a fairly deep drug stress-limiting load after SCTBI (Fig. 1).

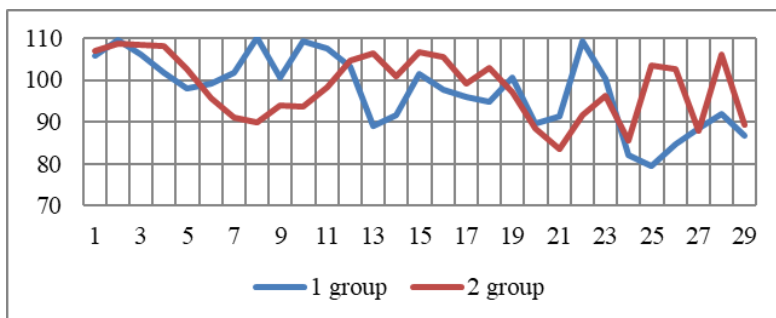


Figure 1. Dynamics of the mesocircular rhythm of the heart rate, beats per minute

Attention was drawn to the rather noticeable synchronicity of heart rate fluctuations, especially in the first two weeks of the acute period of SCTBI (Fig. 2).

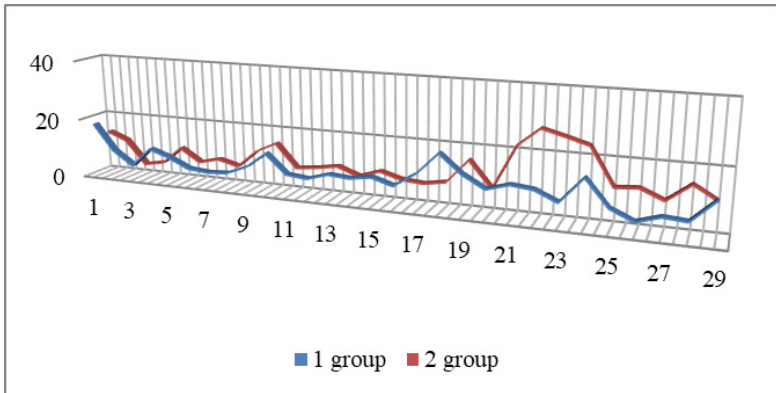


Figure 2. Amplitude of the circadian rhythm of the heart rate per minute

Wave-like fluctuations in the amplitude of the circadian rhythm in the first two weeks occurred almost synchronously with a slight excess of the amplitude of oscillations in the injured children of group 2 (Fig. 2).

A decrease in the CI of less than 1.2, revealed in both studied groups of injured children, is noted in diseases associated with vegetative “denervation” of the heart and is associated with a poor prognosis and a high risk of sudden death in patients with severe traumatic disease. The identified persistent downward deviation of the CI indicator allows us to say that the contractility of the myocardium has decreased, and irreversible changes in the myocardium have developed in patients, a high risk of developing chronic heart failure has appeared (Table 4). The minimum CI values in both groups were observed on the first day after injury. On days 2–15, the changes in the CI in dynamics were oscillatory in nature with a more pronounced deformation of the circa-week rhythm of the CI and a more pronounced tendency to increase the amplitude of oscillations in the 2nd group of children (Fig. 3).

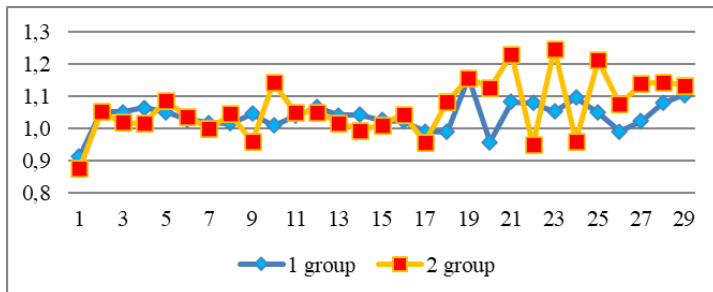


Figure 3. Dynamics of the circadian index in the acute period of SCTBI, units.

A longer inversion of the circadian rhythm of the heart rate was found in Group 1 (46%) than in Group 2 (39%), which indicated less effective stress protection in children in Group 1.

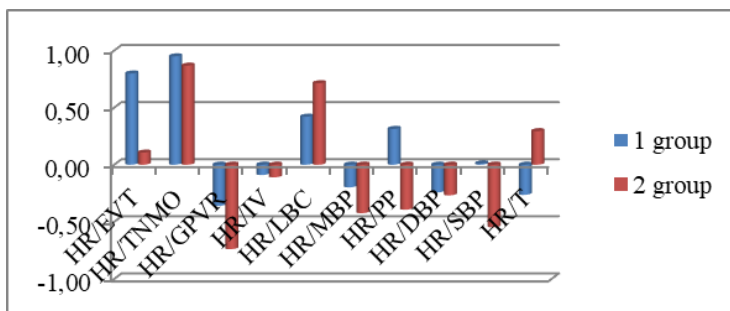


Figure 4. Correlation relationships of HR.

In both groups, a strong direct dependence of the change in MVP on HR was found. Thus, in group 1, the direct correlation between HR and MVP was 0.95, in group 2 - 0.87. The positive correlation between HR and OVT (0.8) indicates insufficiently effective sedative therapy in group 1. While in group 2 this indicator was 0.1. A slight tendency to increase TPR with a decrease in HR (-0.36) becomes reliably significant in group 2 (-0.74). The direct correlation between HR and CO changes in group 2 (0.71) characterizes the tendency to increase CO mainly due to an increase in heart rate. That is, against the background of a fairly massive stress-protective therapy in children of group 2, compensatory activity of the cardiac pacemaker was preserved, which could provide, if necessary, an increase in oxygen delivery to tissues in critical disorders, hypoxia through an increase in the CO indicator. This compensation mechanism in group 1 was at a minimum level (0.4).

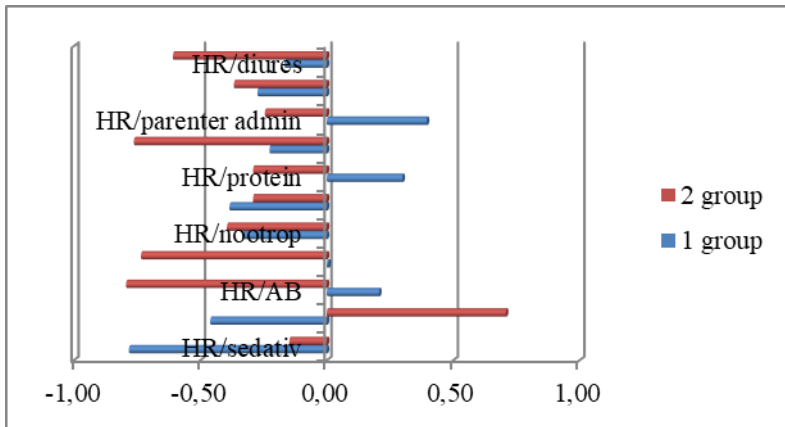


Figure 5. Correlation links of HR with treatment.

In group 1, it was found that the stress-limiting effect was manifested by a tendency to decrease the mesorum of the circadian rhythm of HR in group 1 (-0.78). While in patients of group 2 this fusion was (-0.15) (Fig. 5). The detected increase in HR with an increase in the volume of anti-inflammatory therapy in group 2 (0.71) corresponded to a more severe general clinical condition of children in group 2. While in group 1, a tendency to decrease tachycardia with more intensive anti-inflammatory therapy was noted (-0.46). Reduction of tachycardia syndrome in group 2 was achieved by increasing the frequency of antibiotic administration (-0.79). In this case, a positive effect (decrease in tachycardia) was achieved by vasodilators (-0.73), while in group 1 such an effect was practically absent (0.01). A positive effect on the dynamics of the mesor of the circadian rhythm of the heart rate was found to be an increase in the total daily fluid intake (-0.76) and an increase in the volume of urine excretion (-0.61). That is, in group 2, a positive effect on the heart rate of an increase in detoxification therapy was observed. Conclusion. On the first day of admission to the clinic, as well as on the following days of observation (Table 2), no significant differences in the dynamics of changes in the mesor of the circadian rhythm of the heart rate were found in both groups. At first glance, the study data indicated the effectiveness of the stress-protective therapy. Despite the severity of the condition, acute cerebral insufficiency, which amounted to 7 points on the Glasgow scale in children of group 2, the functional activity of the heart pacemaker continued in a cicada, about-weekly rhythm, which, apparently, should be considered a favorable sign of reversibility of the structures of vital centers even against the background of a sufficiently deep drug stress-limiting load after SCTBI. The identified persistent downward deviation of the CI indicator allows us to say that the contractility of the myocardium has de-

creased, and the patients have developed irreversible changes in the myocardium, a high risk of developing chronic heart failure has appeared. That is, against the background of sufficiently massive stress-protective therapy in children of group 2, compensatory activity of the heart pacemaker was preserved, which could provide, if necessary, an increase in oxygen delivery to tissues in critical disorders, hypoxia through an increase in the CO indicator. This compensation mechanism in group 1 was at a low level (0.4). In group 2, a positive effect of increasing detoxification therapy on the heart rhythm was observed.

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STUDY OF THE CORRELATION BETWEEN VIROLOGICAL AND OBSTETRIC INDICATORS IN PREGNANT WOMEN WITH HBV, HCV INFECTION

Sariyeva Ellada Goshgar

Doctor of Medical Sciences, Associate Professor

Azerbaijan Medical University

Relevance. The problem of viral hepatitis in pregnant women is one of the most pressing in modern medicine, since hepatitis B and C viruses are the main cause of liver diseases in women of reproductive age. In recent years, despite extensive screening programs for HBV infection among pregnant women, as well as active-passive immunoprophylaxis in newborns, resistance to immunoprophylaxis has increased among children born to mothers with a high viral load. Foreign authors, having conducted a large-scale study, discovered a linear correlation between the ineffectiveness of immunoprophylaxis in newborns and a high viral load in the mother's blood.

The most serious risk factor for mother-to-child transmission of HCV is a high viral load in the mother. According to scientific data, the risk of transmission from mothers with Ab+, RNA+ and high viral load is 8%, 12% and 27%, respectively. Children born to mothers with high viremia, delivered vaginally, had a 44% risk of infection.

The goal. The aim of the study was to examine the viral load of pregnant women with viral hepatitis B and C and the correlation indices between clinical and obstetric indicators based on prospective material.

Object of study. The study included 150 pregnant women (the main group - 100 pregnant women with viral hepatitis B, C and the control group - 50 practically healthy pregnant women) and their newborns. The inclusion criteria for the study were as follows: pregnant women; age 18-45 years; hepatitis B virus; hepatitis C virus.

The following criteria were excluded from the study: non-pregnant women; pregnant women without hepatitis B, C; pregnant women with other intrauterine, genital, extragenital infections; pregnant women under 18 years of age; pregnant women over 45 years of age.

The work was carried out at the Department of Obstetrics and Gynecology of the II Azerbaijan Medical University, Baku in 2016-2018.

Research methods. The following were considered prospective research methods: clinical and anamnestic, general routine laboratory and instrumental, obstetric, virological, molecular genetic studies (PCR) and methods of mathematical and statistical analysis. Statistical analysis was performed in MS EXCEL 2019 and IBM Statistics SPSS-26 programs.

Research results. Virological studies showed that 14 pregnant women with HBV infection (25.5±5.9%) had negative PCR, 20 people (36.4±6.5%) had a viral load <2000 IU/ml (mild), 21 pregnant women (38.2±6.6%) had a viral load >2000 IU/ml (high). Among HCV-infected pregnant women, there were pregnant women with a high viral load, since PCR was negative in 9 (20.0±6.0%) and viral load <4x10⁵ IU/ml in 14 (31.1±6.9%) (mild), 6 people (13.3±5.1%) had 4x10⁵ IU/ml - 8x10⁵ BV/ml (moderate); High viral load (>8x10⁵ IU/ml) was detected in 16 people (35.6±7.1%). A statistically significant difference in viral load was found in pregnant women in the HBV and HCV groups (pku<0.001).

According to the PCR analysis results, the average viral load was 2.56±0.27 log₁₀IU/ml in the HBV group (range: - 0.00-6.38 log₁₀IU/ml), in the HCV group 4.41±0.38 log₁₀IU/ml (range: - 0.00). -8.88 log₁₀IU/ml). According to statistics, the average viral load of pregnant women in the HCV group was 71% higher than in the HBV group (pF<0.001; pU<0.001).

Pregnant women in the HCV group were divided into 3 groups according to the virus genotype: 32 people (78.0%) were diagnosed with type I, 6 people (14.6%) with type II, and 3 people (7.3%) with genotype III.

The results of the correlation and statistical analysis revealed a positive correlation between the HCV viral load and the HCV genotype (p = 0.309; p = 0.049). In addition, the HCV viral load (p = -0.328; p = 0.028), PCR result (p = -0.304; p = 0.042) and HCV genotype (p = -0.441; p = 0.004) correlated with the age of pregnant women in the HCV group. At the same time, a positive correlation was recorded between BMI and the age limit in pregnant women in the HCV group (ρ = 0.335; p = 0.024). Thus, according to the results of the PCR analysis, the results of LogPCR higher in pregnant women infected with HCV. There was no statistically significant difference between obesity and BMI in pregnant women with HBV and HCV. No statistical difference was found between the control group by Rh factor and HBV (pku=0.446) and the HCV group (pku=0.158), as well as in the groups where HBV and HCV were detected (pku=0.463). When studying the relationship between biochemical and virological parameters in pregnant women of the main group, it was found that there was a positive correlation between ALT and Log PCR (p=0.275, p=0.006). There is a direct correlation between AST and Log PCR (ρ=0.221, p=0.029).

According to the results of correlation and statistical analysis of the number of pregnancies with the age of the pregnant woman and the genotype of the virus

($\rho = -0.441$, $p = 0.004$) and the viral load of HCV ($\rho = -0.328$, $p = 0.028$), as well as the viral load of HBV between ($\rho = -0.367$, $p = 0.006$) and the number of pregnancies and repeated pregnancies ($\rho = -0.283$, $p = 0.036$), an inverse relationship was observed between the genotype of the virus and the number of births ($\rho = -0.319$, $p = 0.042$). At the same time, a positive correlation was found between the number of births and BMI ($\rho = 0.211$, $p = 0.036$). It was established that the disease in pregnant women with viral hepatitis B, C manifested itself in the form of asthenovegetative, dyspeptic, hepatosplenomegalic, cytolytic, mesenchymal-inflammatory, cholestasis syndromes. The threat of termination of pregnancy, gestosis, fetoplacental insufficiency, oligohydramnios, fetal hypoxia, premature rupture of membranes, hypotonic bleeding during labor and the postpartum period were observed in women with viral hepatitis B, C.

The average Apgar 1 score in newborns varied in the control group from 4 to 9 points, 7.66 ± 0.13 points; In the group of pregnant women with hepatitis, the average score varied from 2 to 9 and was 7.23 ± 0.11 points. This difference in the Apgar 1 score in newborns in the control and hepatitis (HBV and HCV) groups is statistically significant ($pF=0.014$; $pU=0.005$). The average score on the Apgar 5 scale in the control group was 8.68 ± 0.08 points, within the group it fluctuated within 7-10 points. In the group of pregnant women with hepatitis, this indicator fluctuated from 6 to 9 points and averaged 8.05 ± 0.06 points. The obtained results show that Apgar 1, especially on the Apgar 5 scale, in children born in the group of women born with viral hepatitis B, C, is statistically significantly lower than in the group of practically healthy pregnant women ($pF < 0.001$; $pU < 0.001$). The study showed that the frequency of asphyxia among newborns from HBV- and HCV-positive mothers was higher than in the control group (HBV - 3.3 times, HCV - 5.1 times; $p = 0.037$). In 49 healthy (98.0%) newborns in the group of practically healthy pregnant women, the degree of mass is within the normal range, and in 1 (2.0%) it is below the norm. In the group of pregnant women infected with hepatitis (HBV and HCV), the degree of mass in 86 newborns (88.7%) was normal, in 11 newborns (11.3%) it was below the norm.

($p = 0.050$). According to correlation statistics, the correlation between the clinical parameters of children born to mothers with hepatitis of the main group and the viral parameters of their mothers showed that newborns from HBeAg-positive, anti-HBe-positive mothers had more frequent cases of asphyxia ($\rho = 0.281$; $p = 0.042$). A positive correlation ($\rho = 0.281$; $p = 0.042$) was recorded between the maternal HBeAg titer and low birth weight of the newborn. In anti-HCV IgM-positive mothers, the correlation between the viral antigen and neonatal weight parameters showed that children born to patients with the acute phase of the infection had a lower birth weight. Among newborns from HCV-infected mothers, children with hypotrophy and asphyxia were more common ($p = 0.033$).

Conclusion. Thus, the number of pregnancies, repeated pregnancies and repeated births in HBV- and HCV-infected pregnant women is statistically higher than in the control group. However, pregnant women with viral hepatitis B, C have a statistically higher risk of premature birth. The study showed that cases of low birth weight of newborns are more common in the group of pregnant women infected with HBV and HCV, especially in the HCV group. The assessment of newborns by the Apgar scale at the 1st and 5th minutes after birth was statistically significantly lower than in the control group. Infectious antigens in the blood of mothers with viral hepatitis B, C and asphyxia in newborns with viremia, a positive correlation was found between low weight. Early adaptation was unsatisfactory in children born to mothers with hepatitis B and C. The study confirmed that newborns born to mothers with parenteral hepatitis should be classified as a risk group. The study confirms the importance of collaboration between obstetricians/gynecologists and virologists in this area.

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**THE KERDO VEGETATIVE INDEX AND VITAL CAPACITY OF
THE LUNG IN YOUNG STUDENTS DURING THE ORTHOSTATIC
TEST**

Prokopyev Nikolai Yakovlevich

Doctor of Medical Sciences, Full Professor

Tyumen State University, Tyumen, Russia

ORCID ID: 0000-0002-9525-0576

Ananiev Vladimir Nikolaevich

Doctor of Medical Sciences, Full Professor, Leading Research Worker

*Institute of Biomedical Problems of the Russian Academy of Sciences,
Moscow, Russia*

ORCID ID: 0000-0002-4679-6441

Kolunin Evgeniy Timofeevich

Candidate of Biological Sciences, Associate Professor

Tyumen State University, Tyumen, Russia

ORCID ID: 0000-0002-8897-1076

Bykov Evgeniy Vitalievich

Doctor of Medical Sciences, Full Professor

Ural State University of Physical Culture, Chelyabinsk, Russia

ORCID ID: 0000-0002-7506-8793

Ananieva Olga Vasilievna

Doctor of Medical Sciences, Full Professor

Tyumen State Medical University, Tyumen, Russia

ORCID ID: 0000-0002-0672-9164

Vetoshkina Elena Alexandrovna

Candidate of Pedagogical Sciences, Associate Professor

*Khabarovsk Regional Institute for the Development of Education,
Khabarovsk, Russia*

ORCID ID: 0000-0003-3240-8150

Limarenko Olga Vladimirovna

Candidate of Pedagogical Sciences, Associate Professor

Siberian Federal University, Krasnoyarsk, Russia

ORCID ID: 0000-0003-0539-817X

Romanova Svetlana Vladimirovna

*Candidate of Biological Sciences, Associate Professor
Irkutsk State University, Irkutsk, Russia
ORCID ID: 0000-0003-0962-7136*

Gurtovoy Elisey Sergeevich

*Student
Tyumen State Medical University, Tyumen, Russia*

Abstract. *Using random sampling, the authors analyzed the results of studying the Kerdo autonomic index (KAI, c.u.) and vital capacity (VC, cm³) during an orthostatic test with different angles of elevation of the foot end of the couch in 298 young men. The aim of the study was to compare the effect of body position in space on the level of VC, KAI, and basic indices of central hemodynamics in young men from different universities. Material and methods. Using random sampling, we examined 298 young men aged 19.8 ± 0.9 years. KAI was assessed by calculation, and VC was assessed using a portable digital spirometer. HR (beats/min) was counted on the radial artery by palpation for 10 sec. Blood pressure was measured using the Korotkov method (mm Hg). During the orthostatic test, the young men moved from a vertical to a horizontal position, then the foot end of the couch was raised by 25, 33, 43 and 50 cm, respectively, and held in this position for 5 minutes. The duration of the study was 30 minutes. Results and discussion. The results of using the orthostatic test with a change in body position in space obtained during the examination of adolescent students indicated a balance of sympathetic and parasympathetic influences on the adolescent body. It was found that due to a change in body position in space, VC and DBP do not change significantly ($p > 0.05$), while HR significantly ($p < 0.05$) decreases, and SBP increases. Conclusions. Considering the simplicity of studying VIC, VC and basic indicators of central hemodynamics, the possibility of their use in any conditions of human life, the authors recommend introducing them into mandatory use in the practice of clinical medicine and sports.*

Keywords: *students of adolescence, Kerdo vegetative index, vital capacity of the lungs, orthostatic test.*

Relevance. Today, it is a proven fact that the period of study at a university is often accompanied by a deterioration in the health of students [2, 3]. The issues of studying the functional state of the cardiorespiratory and autonomic nervous system of a healthy and sick person at different periods of his life are given close attention [1, 4, 5, 6]. Many methods have been developed and used to study them. In the concept of “vegetative regulation” we put the functional activity of the

body, through which the activity of all organs and systems in a person is carried out and regulated in order to maintain life and balance constantly changing external influences. The above largely applies to students involved in sports.

There is no doubt that any scientific research aimed at developing regional standards for the morphofunctional state of modern student youth are both relevant and in demand. The authors are deeply convinced that today it should become a mandatory rule - a university physical education teacher, starting classes with students, should have a clear idea of their health, functional state and adaptive capabilities. At the same time, in our opinion, his research arsenal should include simple and safe assessment methods that can be used in any conditions of the educational or training process.

The purpose of the study: to compare the effect of body position in space on the level of VC, KVI and basic indicators of central hemodynamics of young men of various sports specializations.

Material and methods. A random sample of 298 students aged 19.82 ± 0.97 years studying in six specialized universities of Russia was examined: Khabarovsk Regional Institute for Educational Development named after K.D. Ushinsky (KhRIED) – 32, Irkutsk State University (ISU) – 74, Siberian Federal University (SFU) – 69, Ural State University of Physical Education – (UralSUPE) 46, Tyumen State University (TSU) – 48, Tyumen State Medical University (TSU) – 29.

The balance between the tone of the sympathetic and parasympathetic divisions of the autonomic nervous system is determined by the KVI [6], which we calculated using the formula:

$$KVI = 100 \times (1 - DBP/HR),$$

where; DBP – diastolic blood pressure (mm Hg); HR – heart rate (beats/min).

The vital capacity was studied using a portable digital spirometer. The heart rate (beats/min) was calculated on the radial artery by palpation for 10 seconds. Arterial pressure was measured according to the method of N.S. Korotkov (mm Hg) on the shoulder. In the orthostatic position, the foot end of the couch was raised by 25, 33, 43 and 50 cm, respectively.

To obtain objective study results, all students were given recommendations.

- Do not smoke or drink alcohol on the day of the study;
- Avoid eating and taking any medications or energy drinks;
- Avoid physical activity, and sit in a chair for 5 minutes immediately before the study and do not change your body position;
- The cuff of the blood pressure measuring device should be placed on the bare shoulder and not squeeze it;
- Measure blood pressure on the same arm.
- Before the study, we asked the young men to go to bed no later than 11 p.m., wake up at 7 a.m., i.e. keep the duration of sleep about 8 hours.

Table 1*Evaluation of the Kerdo vegetative index*

Indicators	Kerdo vegetative index assessment
от +16 до +30	sympathicotonia
≥ + 31	pronounced sympathicotonia
от – 16 до – 30	parasympathicotonia
≤ – 30	pronounced parasympathicotonia
от – 15 до +15	balance of sympathetic and parasympathetic influences

The results of the study were processed on a personal computer using the Statistika program. The reliability of differences was assessed using Student's t-test, and differences were considered reliable at $p < 0.05$.

Ethical review. When working with students, we observed the principles of voluntariness, rights and freedoms of the individual guaranteed by Articles 21 and 22 of the Constitution of the Russian Federation, as well as the Order of the Ministry of Health and Social Development of Russia No. 774n of August 31, 2010 "On the Ethics Council". The study was conducted in compliance with the ethical standards set out in the Helsinki Declaration of the World Medical Association "Ethical Principles for Medical Research Involving Human Subjects", which was adopted at the 59th General Assembly in October 2008. The authors received oral consent from the students to conduct the study and publish the data.

Results and discussion. Considering that the basic indicators of central hemodynamics are HR, SBP and DBP, and VC reflects the functional capabilities of the respiratory system, we tried to study them in young men in the time interval between 9 and 11 am. The results of the study showed that in almost all young men, central hemodynamics in the orthostatic position was within the normal physiological values.

It seems especially important to us that HR (Table 2) in young men indicated good pumping function of the heart, since regardless of the position of the body, it was stably maintained within the normal values - the range was from 52 to 83 beats / min.

Table 2

Basic indicators of central hemodynamics, KVI and VC in students of adolescence of specialized universities of Russia during the orthostatic test

Position	Indicator					
	Heart rate	SBP	DBP	PF	VC	KVI
UralSUPE						
Standing	73,8±1,4	117,2±1,8	67,4±1,5	50,3±1,3	4880±0,415	8,67±0,15
Lying	68,6±1,5	117,6±1,8	67,3±1,5	49,8±1,3	4860±0,415	1,9±0,11

Lying 25 cm	68,0±1,5	117,8±1,8	67,1±1,5	49,7±1,3	4850±0,410	1,4±0,09
Lying 33 cm	67,4±1,5	118,1±1,7	67,1±1,5	49,0±1,4	4845±0,415	0,50±0,04
Lying 43 cm	65,7±1,4	121,3±1,7	67,1±1,5	47,2±1,4	4830±0,420	-2,13±0,12
Lying 50 cm	63,1±1,4	125,2±1,8	67,0±1,6	43,2±1,6	4815±0,430	-6,18±0,18
ISU						
Standing	76,9±1,7	120,3±1,7	73,8±1,5	46,5±1,1	4740±0,405	7,60±0,16
Lying	70,1±1,6	124,5±1,6	71,2±1,5	48,5±1,1	4735±0,405	4,03±0,13
Lying 25 cm	68,7±1,4	124,9±1,6	70,1±1,4	56,2±1,4	4710±0,410	-2,04±0,10
Lying 33 cm	67,2±1,5	125,3±1,7	67,6±1,5	57,7±1,4	4685±0,370	-0,60±0,03
Lying 43 cm	66,8±1,4	126,3±1,7	67,4±1,5	58,9±1,4	4670±0,385	-0,90±0,05
Lying 50 cm	64,6±1,4	126,8±1,7	66,9±1,6	59,7±1,6	4645±0,390	-3,50±0,14
SFU						
Standing	76,2±1,7	119,7±1,8	72,4±1,5	47,3±1,3	4725±0,370	4,09±0,16
Lying	69,7±1,6	125,2±1,6	71,2±1,5	54,0±1,3	4695±0,405	4,03±0,13
Lying 25 cm	68,7±1,4	125,9±1,6	70,1±1,4	55,8±1,4	4675±0,410	-2,15±0,10
Lying 33 cm	67,2±1,5	126,3±1,7	67,6±1,5	57,7±1,4	4655±0,370	-0,60±0,03
Lying 43 cm	66,8±1,4	126,7±1,7	67,4±1,5	59,3±1,4	4630±0,385	-0,90±0,05
Lying 50 cm	64,6±1,4	127,8±1,7	66,9±1,6	60,9±1,6	4605±0,390	-3,56±0,14
KhRIED						
Standing	77,5±1,5	121,7±1,6	75,2±1,6	46,5±1,5	4785±0,390	2,97±0,08
Lying	70,4±1,6	125,5±1,6	71,2±1,5	54,3±1,1	4695±0,405	-1,14±0,13
Lying 25 cm	69,6±1,7	126,1±1,7	71,0±1,5	55,1±1,1	4670±0,410	-2,01±0,10
Lying 33 cm	68,3±1,6	126,6±1,6	69,8±1,5	55,6±1,1	4645±0,370	-2,20±0,11
Lying 43 cm	67,8±1,5	126,9±1,6	69,7±1,4	55,9±1,1	4620±0,385	-2,80±0,13
Lying 50 cm	65,7±1,7	127,3±1,7	68,2±1,5	59,1±1,1	4605±0,390	-3,81±0,12
TSMU						
Standing	79,3±1,8	126,4±1,8	76,1±1,7	50,3±1,7	4490±0,420	4,04±0,02
Lying	72,5±1,6	129,2±1,6	72,7±1,5	55,5±1,1	4465±0,405	-0,28±0,13
Lying 25 cm	69,6±1,7	129,9±1,7	72,4±1,5	57,5±1,1	4450±0,410	-4,02±0,10
Lying 33 cm	68,3±1,6	130,7±1,6	71,6±1,5	59,1±1,1	4445±0,370	-5,46±0,11
Lying 43 cm	67,8±1,5	131,1±1,6	71,3±1,4	59,6±1,1	4420±0,385	-5,16±0,13
Lying 50 cm	65,7±1,7	131,3±1,7	71,1±1,5	60,2±1,1	4415±0,390	-8,22±0,12
TSU						
Standing	74,8±1,54	122,5±1,6	73,3±1,6	49,2±1,7	3995±0,420	1,47±0,14
Lying	68,5±1,4	124,7±1,7	70,4±1,4	54,3±1,4	4820±0,365	1,59±0,09
Lying 25 cm	67,7±1,5	125,3±1,8	69,8±1,4	55,5±1,4	4790±0,410	-2,77±0,08
Lying 33 cm	67,1±1,5	125,9±1,8	69,6±1,5	56,3±1,4	4775±0,370	-3,78±0,03
Lying 43 cm	66,3±1,4	126,4±1,7	69,0±1,5	57,4±1,4	4760±0,385	-4,07±0,08
Lying 50 cm	65,4±1,4	127,2±1,7	68,6±1,6	58,6±1,6	4725±0,390	-4,89±0,14

Thus, only by studying each student's individual characteristics of central hemodynamics and the values of the VIC, and then generalizing them, we were able to form a true idea of the functional state of the young men. Naturally, we under-

stood that the course of the study and its results can be interfered with by factors of the external environment independent of a person, primarily atmospheric factors, which can change not only during the day, but even during the hour. We are inclined to believe that at the beginning of receiving training in the first semester, the influence of atmospheric meteorological conditions on young students, regardless of the region of residence, was relatively stable, so they did not have any significant effect on the results obtained. We also believe that a change in body position during an orthostatic test is a kind of stress reaction for the human body, to which, first of all, central hemodynamics reacts. The results of calculating the KVI when changing the body in space highlighted a number of interesting features in scientific and practical terms. Firstly, all young men, regardless of the region of residence, had a balance of sympathetic and parasympathetic influences of the autonomic nervous system. Secondly, there was a clear relationship between the ratio of the DBP and HR per minute. We assumed that with a balance of the sympathetic and parasympathetic tone of the autonomic nervous system, which is typical for healthy young men adapted to external conditions, the DBP value is numerically close to or equal to the HR value. Thirdly, there is a clear dependence of the HR and SBP on the angle (height) of the rise of the foot end of the couch, i.e. the larger this angle, the more significant the changes in central hemodynamics.

It can be concluded that the orthostatic test is an important tool for assessing the ability of the human body to adapt to changes in body position and regulate blood circulation, especially in athletes. It helps to identify disorders in the functioning of the autonomic nervous and cardiovascular systems. Normally, there is a moderate increase in pulse and stabilization of blood pressure when moving from a lying to a standing position, and deviations from these values may indicate pathologies that require attention.

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

Transparency of the study. The study had no sponsorship. The authors are solely responsible for providing the final version of the manuscript for publication.

Declaration of financial and other relationships. All authors participated in the development of the topic, design of the study and writing the manuscript. The final version of the manuscript was agreed upon and approved by all authors. The authors did not receive a fee for the study.

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CHALLENGES TO THE EFFECTIVE IMPLEMENTATION OF PUBLIC-PRIVATE PARTNERSHIPS

Alimbetova Mayra Serikovna

PhD student

Almaty Multidisciplinary Clinical Hospital

Kurakbaeyev Kuralbay Kurakbaevich

MD, Professor

Medical University-Higher School of Public Health

Ismailov Zhumagali Kazybaevich

MD, Professor

International Academy of medicine and sciences

Baymuratova Mayrash Aushatovna

PhD, Professor

Medical University-Higher School of Public Health

Abstract. Introduction. *The implementation of PPP models is associated with certain risks for both the public and private sectors. Studying this issue is necessary for decision makers in order to improve long-term planning and risk assessment.*

Materials and methods. *Search strategy: Open access articles were searched using the following scientific publication databases and specialized search engines with a depth of 25 years: Pubmed, Medline, Google Scholar, Mendeley, EMBASE, ClinicalTrial, Cochrane Central Register of Controlled Trials, Elibrary, CyberLeninka.*

Results. *The search returned 19 articles. The literature review revealed problems with the legal regulation of the PPP model, identified violations, failure to comply with certain clauses, and omissions in drafting contracts. Lack of resources, untimely payments by the state to the private sector, discrepancies between payments and costs, low levels of trust and interaction between partners, insufficient risk assessment, and the lack of clear regulations and standards for assessing the performance of PPPs are the problems identified in this literature review.*

Conclusion. *There is not much data on the problems and risks of implementing PPP models. More reports and research in this area are needed.*

Keywords: *PPP, implementation issues, risks, legal regulation.*

Introduction.

A public-private partnership (PPP) is an agreement between one or more public and private entities, usually of a long-term nature, that reflects mutual responsibility in promoting common interests.[1]. The implementation of PPP models is associated with certain risks for both the public and private sectors. The study of this issue is necessary for decision makers in order to improve long-term planning and risk assessment.

Materials and methods. Search strategy: Open access articles were searched using the following scientific publication databases and specialized search engines with a depth of 25 years: Pubmed, Medline, Google Scholar, Mendeley, EMBASE, ClinicalTrial, Cochrane Central Register of Controlled Trials, Elibrary, CyberLeninka

Management and Policy Structure

One of the incentives for the implementation of PPP was, at first glance, simplified government regulation [1].

However, several studies have identified problems with legislation in regulating public-private interactions. Normative legal acts had significant shortcomings and did not reflect the entire regulatory process between the relevant stakeholders. Recommendations reflected in normative legal documents had a problem of integration into the treatment process [2].

Findings from the study by Okal J, et al. indicate that access to sexual and reproductive health services in southwestern Uganda is limited by both facility and individual level factors that can be addressed by including public facilities in the program. Accreditation of public facilities can expand the reach of the voucher program by reaching a wider range of poor mothers, reducing distance to services, strengthening public-private sector linkages through public-private partnerships and referral systems, and ensuring awareness and support of policymakers, which is critical to mobilizing resources to support program sustainability. In particular, identifying policy champions and consulting with key policy sectors are key to successful inclusion of the public sector in the voucher program [1,2,3].

In the health sector, policies and laws have an important influence on PPPs, and regulations and guidelines influence the management of care, institutional forms of service delivery, and stability of governance [4,5].

Weaknesses in the current legal framework also affect the existence of cooperation contracts. Some studies have found violations and failure to implement certain clauses of contracts, and in some cases, contracts were not concluded at all, or all the details were not specified, or incorrect wording was used, which in the future created certain problems in the implementation of projects [1].

In their study, Karpagam S. et al. found that measurable outcomes of services provided were not specified in the contract [6]. Also identified were: lack of stra-

tegic vision and commitment from different partners, poorly defined roles and expectations, difficulties in coordinating activities of members and lack of leadership skills [7]. As reported by Uplekar M., a significant proportion of private service providers are still not involved in collaboration and do not follow recommended methods of TB treatment. Unresolved issues include weak collaboration between the private and public sectors, poor compliance and insufficient funding [8].

Resources.

Lack of funding is the main problem of lack of resources. Late payments by the state to the private sector have been the reason for patients refusing to use the services of medical institutions [9].

There was also a problem of incomplete coverage of financial resources for services already rendered, which led to a decrease in quality. Financial constraints also contribute to inadequate monitoring of the quality of medical services rendered [10].

Lack of qualified and trained personnel [2]. There was a problem that services at the expense of the state budget were provided by less competent workers or those with little experience, as well as medical centers that had small volumes of medical care before the PPP [3]. Some earlier studies emphasized the insufficient level of knowledge related to diagnostic procedures and treatment, and the low level of knowledge in legal regulation [11,12]. All this could have a questionable impact on efficiency and could simply be dangerous for patients [2,3].

Alonso JM et al found that private centers had fewer medical staff than public centers [14].

Nuhu et al also highlighted the problem of accessibility of drugs and medical equipment, which resulted in patients having to pay out of pocket [3].

Okal et al reported that at least 72% of public health facilities experienced shortages of drugs and medical equipment (supplies) [2].

Interaction, communication, trust and commitment

Insufficient interaction between the private and public sectors was noted in some studies, there was a lack of openness and mutual participation in decision-making, and communication between partners was weak [2]. There was also a low level of trust between partners, which led to mutual blame and low commitment to cooperation [15]. Additional problems arose from the low effectiveness of the private sector in caring for the poorest segments of the population, which caused concern and mistrust in the public sector [9]

As respondents to a study in Pakistan [16] described these problems, a government official: "From the inception of the idea to monitoring and evaluation, there are opposing forces at all these levels; at the MoU stage, there is resistance at the ministerial level, both at the federal and provincial level. There is a monopoly in places. understand the usefulness of PPPs. If the government does its job properly,

the problems can be solved.” A donor agency official: “If the government starts using NGOs instead of the regular public sector, it will be seen as the government not trusting its own system. So, I think unless the thinking changes at the strategic level and there is a clear political push in that direction, nothing will change.” An NGO official: “There are problems at all levels; they need to be faced and solved. People who say nothing can be changed and there is resistance from the government, they really do not want to change. Obviously, if the Government was not able to do something earlier, and if an NGO wants to make some changes, it will not be easy against the existing state of affairs” [16].

NGOs and the public sector continue to hold each other accountable for certain tasks, and this is largely a result of the lack of clarity in the roles and responsibilities of each sector, both within partnerships and when working separately.

Participants in the Indian study expressed a tension between public good and profit making [17]. Bureaucratic procedures and perceptions of misuse of the program appeared to discourage physicians from participating in the program or not participating at all. Some obstetricians feared that participation in the program would lower the status of their practice, and some were deterred by the possibility of more severe clinical cases among eligible beneficiaries. Some physicians expressed resentment at taking on what they saw as the government’s responsibility to provide safe maternity services to women below the poverty line. Younger obstetricians in the process of setting up private practices and obstetricians from more remote and ‘less competitive’ areas were more willing to participate in the PPP program. Some physicians had concerns about the quality of care they could provide given the financial constraints of the scheme. Bureaucratic difficulties and a trust deficit between the public and private health sectors influence the retention of private practitioners in the PPP system [17].

Risks.

The implementation of PPP is associated with a number of risks, including the complexity of financing and organizing the project, as well as high investment costs, project duration, technical expertise, political influence and government involvement [18]. Evaluation of all risk factors and their reflection in contracts is necessary for the successful implementation of the project [18]. According to some data, there were disagreements between the participants, due to the fact that the private side accused the public sector of incompetent managers and demanded an increase in the cost of services, while the public sector discovered that the private sector was only concerned with profit, saving on costs, which affected the quality of services [19].

Monitoring and evaluation.

Monitoring of PPP activities is essential for the success of the project. However, according to some reports, monitoring has not been carried out for more than

10 years, while according to other reports, audits were not carried out properly, as a result of which it was impossible to assess whether the set objectives were being achieved. Reports were not provided regularly or were incomplete [2].

The findings of Engel N et al.'s study in India show that in PPP initiatives, underlying problem definitions and different control methods including supervision, standardization and culture continue to conflict and ultimately hinder the expansion of PPPs. Successful PPP initiatives require the integration of organizational control practices ingrained in different professions. This entails a difficult balance between innovation and control. Innovators address these issues in different ways based on their own understanding of the problem that the PPP is intended to solve and their own control methods [8].

For information and technology systems, challenges arose from unclear policies and regulations regarding the implementation and evaluation of PPPs, documentation and record-keeping issues among private sector providers, weak capacity for cross-sector collaboration or implementation of regulations, information gap and lack of standardization, and insufficient monitoring due to the absence of defined indicators [5].

Compliance with the provisions contained in the contract should be regularly monitored and audited. A quality assessment system and monitoring according to key performance indicators of the PPP should be stipulated in the contract, taking into account the budget and competent personnel. For better results, monitoring can be carried out by a third party [2].

Conclusions. The literature review revealed problems in the legal regulation of the PPP model, violations, failure to comply with certain clauses, and omissions in drafting contracts. Lack of resources, untimely payments by the state to the private sector, discrepancies between payments and costs, low levels of trust and interaction between partners, insufficient risk assessment, and the lack of clear regulations and standards for assessing the performance of PPPs are the problems identified in this literature review.

Conclusion. There is not much data on the problems and risks of implementing PPP models. More reports and research in this area are needed.

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GENDER CHARACTERISTICS OF COGNITIVE AND PSYCHOEMOTIONAL DISORDERS IN ELDERLY PATIENTS WITH HYPERTENSION

Solovey Darya Andreevna

Student

Borodina Darya Sergeevna

Student

Shulekina Darina Nikolaevna

Student

Voronezh State Medical University named after N.N. Burdenko

Scientific Advisor - Gosteva Elena Vladimirovna

Doctor of Medical Sciences

Voronezh State Medical University named after N.N. Burdenko

Abstract. *The aim of the study was to evaluate the features of the cognitive and psychological domains of individual viability in elderly patients with hypertension with a very high risk of cardiovascular complications who suffered an ischemic stroke, depending on gender differences. A single-stage open-label study was conducted, which included 72 patients with arterial hypertension who had suffered an ischemic stroke, of which 39 people (54.2%) were men who made up group 1, women - 33 people (45.8%) made up group 2. The average age was 67 ± 5 years. The MoCa test was used to study cognitive functions, in group 1 the total score was 21.3 ± 1.1 points, in group 2 – 25.0 ± 1.2 points ($p=0.026151$). The analysis revealed that 13 men (33.3%) and 16 women (48.5%) had anxiety (defined as ≥ 8 points on the HADS scale). Depression (≥ 8 points) was experienced by 6 men (15.4%) and 10 women (30.3%). According to the average number of points scored, the level of depression is higher in women ($\Delta 16.7\%$, $p < 0.05$). Thus, gender differences in elderly patients with hypertension at high risk of cardiovascular complications consisted of the fact that women were significantly more likely to have anxiety-depressive disorders, while their cognitive abilities remained at a higher level than men.*

Keywords: *gender characteristics; cognitive impairment; arterial hypertension.*

Relevance

To date, the works of domestic and foreign authors have shown that biological and sociocultural gender contribute to differences in cardiovascular disease risk factors, treatment, and outcomes [1,2]. However, very often in scientific works, taking into account gender as a variable remains underestimated [3]. The risk of developing complications, including cerebral ones, against the background of arterial hypertension (AH), atherosclerotic lesions of the arteries increase significantly, especially in old age [4, 5].

In patients of older age categories, activation of inflammaging, insufficient correction of blood pressure, and metabolic disorders lead to the formation of disorders in the psychological domain of individual viability. The incidence of hypertension in elderly people reaches 60%, depressive disorders – 10-30%, and the prevalence of anxiety symptoms covers over 50% of the elderly population. Moreover, anxiety and depression are closely associated with cognitive impairment, deterioration of functional results [6, 7], significantly worsening the quality of life of elderly patients, creating difficulties in carrying out rehabilitation measures for them [8]. There is no single view on the relationship between the severity of anxiety-depressive disorders and gender, while some authors demonstrate a more frequent development of anxiety-depressive disorders in women [9; 10]. However, there are not enough studies in the literature studying the age-associated relationship with gender in patients who have suffered an ischemic stroke.

In this regard, the assessment and control of geriatric syndromes depending on gender differences is particularly relevant, which will allow us to find a personalized approach to patients.

The aim of the study is to evaluate the characteristics of the cognitive and psychological domains of individual viability in elderly patients with arterial hypertension at very high risk of cardiovascular complications who have suffered ischemic stroke depending on gender differences.

Material and methods. A one-stage open study (October - December 2023) was conducted at the rehabilitation department of VGKB No. 10, which included 72 patients with arterial hypertension who had suffered an ischemic stroke. The average age was 67 ± 5 years.

Inclusion Criteria: Elderly patients according to WHO criteria (60-74 years old), diagnosed with arterial hypertension grade 1-2, stage 3, risk IV, who suffered an ischemic stroke more than 6 months ago [6], no aphasia or severe cognitive impairment. **Non-inclusion criteria:** 1) repeated stroke 2) significant symptoms speech, history of visual, auditory and/or mental disorders 3) having a pronounced degree of dependence on outside help; 4) liver and kidney diseases in the terminal stage, heart failure in the decompensation stage.

The psychological domain of individual viability included an assessment of the level of anxiety and depression according to Hospital Scaleratings (HADS),

which has two components for studying depression and anxiety. Questions were rated on a 4-point scale, with a score of ≥ 8 on any scale indicating possible depression/anxiety. Cognitive status was analyzed using the Montreal Cognitive Assessment (MoCA). The maximum score for the test is 30; it is considered that the subject has no signs of cognitive decline when gaining ≥ 26 points.

Statistical processing was carried out using programs STATISTICA 10.0. Quantitative variables are presented as Me (Q25%, Q75%), continuous - $M \pm SD$ (M is the mean value, SD is the standard deviation). Qualitative variables are presented as frequency of occurrence (%). The results of statistical analysis were considered significant at $p < 0.05$.

Research results. Of the 72 patients examined, 39 (54.2%) were men and formed group 1, while 33 (45.8%) were women and formed group 2. The average age of men was 63 ± 2 years and 69 ± 3 years for women, which was 8.7% higher ($p < 0.05$). Body mass index (kg/m^2) was 28.9 (23.8; 33.7) for men and 34.5 (29.9; 36.1) for women, a difference of 16.2% ($p < 0.05$). The clinical and demographic results are presented in Table 1.

Table 1
Clinical characteristics of the studied patient groups depending on gender differences

Indicator, units of measurement	Group 1 (n=39)	Group 2 (n=33)
IHD, people (%)	29 (74.4) **	16 (48.5)
AG, I st., people (%)	11 (28.2)	25 (75.8) ***
AG, II st., people (%)	28 (71.8) ***	8 (24.2)
CHF I-II FC according to NYHA	30 (76.9)	24 (72.7)
Smokers, people (%)	30 (76.9) ***	3 (9.1)
Burdened heredity, people (%)	18 (46.2)	20 (60.6) *
Diabetes mellitus, people (%)	8 (20.5)	12 (36.4) *
Chronic kidney disease, people (%)	14 (35.9)	13 (39.4)

Note: AG - arterial hypertension; IHD - ischemic heart disease; CHF - chronic heart failure; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ between groups 1 and 2

Thus, when assessing the somatic domain of individual viability in elderly patients who suffered an ischemic stroke, it was found that men were significantly more likely to have ischemic heart disease, a higher degree of arterial hypertension, and were more likely to smoke. At the same time, women were significantly older, more likely to have diabetes mellitus, an aggravated heredity, and a higher body mass index.

In our study, we used the MoCa test to examine cognitive functions, which allows for a more in-depth and broad assessment of basic functions such as attention,

memory, speech, abstract thinking, etc. In group 1, the total score was 21.3 ± 1.1 points, in group 2 – 25.0 ± 1.2 points (Student's t-test value: 2.27; $p=0.026151$).

A recently published systematic review showed that depression in the post-stroke period is common among both men and women, but is more common in women [11]. However, it is not yet fully established whether this prevalence persists in older age groups. According to statistics, anxiety affects about a quarter of stroke patients, which corresponds to lower rehabilitation outcomes.

Our study found that among elderly patients, the anxiety level on the HADS scales was elevated in 29 people (40.3%), and depression in 16 people (22.2%). Men scored an average of 5 (4; 9) points on the anxiety scale, while women scored 7 (5; 10) points ($\Delta 28.6\%$, $p < 0.01$). Analysis of the results revealed that anxiety (defined as ≥ 8 points) was experienced by 13 men (33.3%) and 16 women (48.5%).

When assessing the level of depression on the HADS scale, elderly men scored 5 (2; 7) points, and women 6 (4; 8) points. At the same time, depression (≥ 8 points) was experienced by 6 men (15.4%) and 10 women (30.3%). In women, the average number of points scored showed a higher level of depression ($\Delta 16.7\%$, $p < 0.05$), they more often indicated a melancholy depressed mood, inability to concentrate, and forgetfulness.

Our results show that elderly women in the post-stroke period suffer from sub-clinical anxiety and depression more often than men. The psycho-emotional state is apparently influenced by the fact that patients have not yet gotten used to their condition, do not know how their future health and cognitive impairment will develop [12].

Conclusion. Thus, our study demonstrated gender differences in elderly patients with arterial hypertension at high risk of cardiovascular complications who had suffered an ischemic stroke, which consisted in the fact that women were significantly more likely to have anxiety-depressive disorders, while their cognitive abilities remained at a higher level than those of men.

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COSMONAUT TRAINING IN THE CONDITIONS OF THE SMO: AI AND OTHER MECHANISMS OF INFLUENCE ON THE FUTURE OF MODERN COSMONAUTICS

Kharlanov Alexey Sergeevitch

*Candidate of Technical Sciences, Doctor of Economic Sciences,
Chief Scientific Officer*

Research Institute of the Yuri Gagarin Cosmonaut Training Center

Abstract. *the author examines the tasks of training cosmonauts, astronauts and taikonauts during the period of the Russian SMO in Ukraine, when the number of international sanctions, retaliations and reprisals has already exceeded 20 thousand, which forces us to place new emphasis on space training and assess the strengths of our competitors and opponents in the conquest of the Solar System and exits into deep space.*

Keywords: *Roscosmos State Corporation, Russia, SMO, China, USA, NASA, ESA, taikonauts, astronauts, Lunar program, Mars program, colonists, extraterrestrial stations, AI, Big Data, neural algorithms, smart grid, smart homes, avatars, metaverse, ecosystem, star wars, spacecraft, remote sensing of the Earth, virtual and augmented reality.*

The influence of generative AI on the training of astronauts is increasingly becoming vital, since it can allow, in a limited space, by creating images in meta-verses and using virtual and augmented reality technologies, to determine the motivation for flights and the ability of people to quickly adapt under stress to the normal course of events on board spacecraft (BS). Such problems were solved individually in the confrontation between the systems of the USSR and the USA in various space race projects: from the creation of the first satellite to the fake landing on the Moon, filmed by Hollywood producers [1]. At the same time, flights into near (inside the Solar System) and deep space can already be simulated in a number of cases for an experiment before the researcher and set a certain set of requirements for the level of his training, for cognitive neurosimulations, for the trained reaction, for the development of creative thinking, for the professional ability to follow the scientific agenda and for the ability to understand what kind of difficulties may arise in long galactic missions or during the construction of

extraterrestrial bases on the Moon, and later on Mars [2]. As for the possibilities of using avatars that simulate survival processes in metaverses or in gaming zones, which are designed to soften the impact of complex threats on the astronaut's brain and hedge the emerging fears of a living person about the permafrost and the darkness of the loneliness of the Solar System and other galaxies, which, little by little, continue to form a state of detachment from the reality of what is happening with their size, temperature and complete lack of diversity of images confirming the loneliness of people in closed capsules of their jump into the unknown [3]. This is the state of "space looking at you", from the infinite depths of the Universe, fatally incomprehensible and hostile to all living things through the principle of entropy growth and due to the intensification of chaos in the movements in the ongoing reactions of biological beings, daring to steal the knowledge of the "seething" emptiness, as in the Soviet classics of A. Kazantsev or other, humanistically sobering Lem's fantasy, captivating with its philanthropy of Solaris's greetings, from the already irretrievable past to the still possible, and to such a fragile, but also native to each of us, scenario of a favorable future. The very consciousness of an astronaut is unlikely to be able to constantly and heroically think both sensually and rationally at once, and tirelessly fight for a potential contribution to science or for the salvation of abstract humanity, fencing itself off from its problems with a set of possible experiments in the cosmic continuum. The latter should carry step-by-step involvement in new opportunities for the manifestation of scientific and technological progress in materials and technologies, give a charge to their own solvency and confidence in the correctness of the choice made, as a lifeline of developed competencies between a lifeless vacuum and the contours of the body, retaining the remnants of heat, as a guarantee of life and returning home to their loved ones from orbit [4].

These "mind games" as the basis for the cognitive transformation of growing loads today are what AI itself is called upon to predict, which through the development of machine learning of neuroalgorithms becomes the support for neuroinformation technologies, "based on methods developed in medicine and on recording means of electroencephalography, functional magnetic resonance imaging and other computerized methods of neuroimaging, which in the process of evolution have reached a level that allows planning and preparing experiments on board space stations [5].

In particular, both NASA in the USA and the European Space Agency (ESA) are already experiencing a successive stage of growth and "explosive leap" of technologies, trying to combine the financial costs of the inevitable "biting" into the cosmic distances, and into the scientific and military component itself, not ready to combine the ideas of leadership and competition in their programs for conquering the Earth's satellite and distant planets, comets and asteroids. It is these scraps of

lifeless icy matter that give us real chances for the use of new types of weapons on their surfaces and provide the opportunity to extract the corresponding transuranic and rare earth metals, as the basis for the expected self-sufficiency in the dialogue of business and the state (public-private partnership) [6]. That is why PPP is being pushed today by the Anglo-Saxon classic of division of competences and growing costs in Daniel Kahneman's behavioral economics, in the implementation of creative industries capable of combining a dream with the burden of overloads and an eternal deficit of financial flow, which, according to NASA, "is always based on excessively optimistic forecasts, but closes the "black holes of budgets" and unfinished ambitious projects" [7]. In other words, what the neocons come up with in their "star wars" or is drawn in the Marvel universes of cartoons and comics will still fall on the shoulders of Captain America and his comrades in the fight against Evil. And this substance is always specific, but spread across various planets and galaxies, awaiting new "rescue missions" and the emergence of a whole class of astronaut-adventurers who want to solve their earthly problems in the cosmic empyrean and at the expense of creators and dreamers [8]. That is why the scale of dreams and fabulous budgets of many projects from Apollo and Galileo to the "Martian Chronicles" of at least Ray Bradbury, as well as the formation of extraterrestrial-based electronic telescopes, not only spur the development of technological tracks for accumulating the required knowledge, materials and points of their constant circulation around celestial bodies, but also ground the Pentagon's appetites for the use of weapons based on geophysical and non-classical principles, especially after the signing of the Lunar Program by Donald Trump and their development after the creation of the US Space Forces in December 2019 [9]. It was this summation of the developed technologies and tasks of extraterrestrial competition that launched a new earthly "arms race", not allowing the world to breathe out after the detente, introduced proxies into the confrontation and became fixated on new neocon conflicts solving the problems of keeping neocolonialism afloat and beyond, for the next 500 years [10]. At the same time, Joe Biden's provocation about his readiness to return to the consideration of the current formulations of the START Treaty, which, in the opinion of the Americans, could pit us against the collective South and China, in particular, is designed to further marginalize us during the unstable course of presidential changes in the United States, giving the world a new freeze and the Ukrainian junta a respite until it receives even larger military aid packages, in the event of a Democrat victory [11].

The present scientific and technological revolution clarifies the tasks facing humanity in testing such technologies (NBICS) of Industry 4.0, which must take into account the methods of direct and indirect testing of the command (group) and personal work cycle of the created crews of manned spacecraft (MSC). This same attitude to the matter will allow us to determine not only the sequence of implemen-

tation of multi-stage processes of a single life cycle of extraterrestrial work based on the coherence of astronauts performing their personal tasks, possessing a duplicate set for each other in mastering unique skills and competencies that can bring maximum returns due to the resulting multiplicative effects as a result of the efforts made, to optimize and reduce costs for harmonizing and coherently performing team actions of crews on board, but also to determine theoretically and experimentally the flight duration itself and the time of real stress of the crew, for its preservation and maintenance of its cognitive and physiological functions in a capable state [12].

If we correlate the actions of neural algorithms in machine learning with the tasks of robotic support of the crews themselves in long-term space expeditions, then it is necessary to pay special attention to the concept of using collaborative robotic technologies and means (CRTaM) responsible for the bio-technogenic environment at stations and capable of initially assessing the risks of mutual development in a single ecosystem on board the ship and the probability of obtaining the necessary reliable results under conditions of overloads and interplanetary drift. At the same time, they should be conditioned by the uniform rates of the ongoing work cycles of synchronization of human and robot activities, with an emphasis on their mutual influence and taking into account their general compatibility based on the contacts being built in the process of organizing space experiments on manned spacecraft, building extraterrestrial infrastructures of satellite communication systems or commercial / military remote sensing surveys. At the same time, the tasks themselves that can be solved within the “man-machine” pair will depend on the success of the tools for analyzing the feasibility of joint operations, as an argument for the function of the mutual cooperation being formed, specific steps of interaction with the functioning of the radio engineering system (RES) during long-term flights of a space expedition [13].

1. The development of neuroinformation technologies based on methods developed in medicine and in the means of electroencephalography, functional magnetic resonance imaging and other computerized methods of neuroimaging have reached a level that allows planning and preparing experiments on board space stations, making them an environment for real and mathematically modeled experiments on orders from science or global TNCs waiting for “space breakthroughs” and “super-profitable discoveries”. 2. Tests and justifications require a methodology for using neuroinformation technologies to select candidates for astronauts and assess the coherence of the work of the formed crews of the spacecraft, setting priorities for the tasks being formed, and introducing a system of indication and indicators of the effectiveness of the division of competencies and profiles.

3. The main areas of using neuroinformation technologies in manned cosmonautics at this stage of research include:

- ongoing examinations of current professional astronauts;

– setting up new scientific experiments on the spacecraft, including within the framework of the new Russian Orbital Station (ROS), lunar and Martian programs, as applied tasks for taking into account changes in the human body during space odysseys.

4. It is advisable to consider the possibility of setting up new on-board experiments (targeted work) at a near-earth orbital station to study the methodological and hardware features of the use of neuroinformation technologies in the interests of ensuring the safety of manned missions and obtaining new scientific results, creating a single international database for examining astronauts and building international cooperation and accompanying the convergence of the best international practices for hedging health among all actors in the global space industry.

5. Create various country and block cooperation through the possibility of involving various space agencies in projects of robotic-humanoid research and generative AI systems used in the process of searching for certain celestial bodies in a network of devices capable of landing and lunarizing resource-rich comets and meteorites, as part of the extraterrestrial infrastructure being created [14].

Thus, in August 2024, Yu.I. Borisov was invited to the campus of a Chinese university in Shanghai, which was developing only a theoretical accelerated delivery of valuable regolith components from the Moon through a series of magnetic traps and vortex sensors profiled in relation to the Earth's orbit, capable of manipulating the gravity and speed of containers to deliver this flow of extraterrestrial minerals to its Chinese consumer. The very processes of building AI competencies for training astronauts for future missions in the West and in the countries of the global South rest on the possibility of paying off these projects through commercial tourism (as Elon Musk does, Boeing and some NASA cooperation firms offer, Joe Bezos advertises and Richard Branson, a celebrity who recently retired from commercial flights between planet Earth and its closest satellite, agitates). Science itself still has re-industrial foundations for fishing with an increasingly precise and safe "interplanetary net," capable of catching flying past unclaimed resources, the possession of which will allow their lucky "fishermen" to hit the jackpot [15].

The participation of AI in the configuration of attracting international scientific centers to this process: not only to divide the profiles of astronauts into fishermen and cabbies, but also to provide universal competencies for the development of competitive advantages in the cheapness of technologies and the flexibility of their use in various fishing spots, as an emerging extra-planetary space infrastructure. The requirements for it, as a digital and as a logistic one, having absorbed the ideas of "smart homes" and "smart grid", networks of generation of high efficiency and protection from leaks and losses during the redistribution of energy flows should already now take into account that NBICS solutions will displace, as science fiction has already shown, the human factor from the extraction of valuable compo-

nents of the Universe by replicants and cyborgs, which is already happening with the World Ocean in the field of bio-aquatic resources (BAR), dividing the ocean into “blue” and “green” [16]. Therefore, the tasks of people preparing “space drivers” or “extraterrestrial fishermen” through AI solutions will increasingly flow into the area of cost optimization, and generative AI systems will prompt the teachers and instructors of the “star landing” through whom and when to replace the humanoid with a machine and make this world “iron” and “thirsty for super-profits” from extraterrestrial scales of expectations and monstrous exploitation of an ever-developing superintelligence, going through its stages of evolution and increasingly imbued with the expectations of mammoth hunters and plant growers who once tried to remain rational and modest in their desires... [17] Russia, in the conditions of the SMO, has a very short lag for reflection and should already now understand the models of manned and unmanned cosmonautics for the same navigation or sending trucks into orbits or planets, allowing us to kill several birds with one stone: to maintain the required technological innovations from leadership positions and educate a hybrid of Samodeikin and Rambo, as a pilot and defender of the interests of the Motherland in space and on distant cosmic bodies. Moreover, we must have time to create scientific and technological cooperation in the training of astronauts from countries friendly to us, before they go to competitors and to foreign space tourism, in particular [18]. Do we have our own domestic Sergei Korolev for this and will we be able to set tasks for less than 30 astronauts from Russia and Belarus to meet the challenges of the time or, and further, will we observe the excitement of potential astronauts, who are formed on the basis of volunteer volunteers storming NASA offices in each state in the USA up to 14 thousand candidates for star adventures every month?.. [19]

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ARGON-ARC WELDING OF COMPOSITE MATERIALS BASED ON IMMISCIBLE COMPONENTS

Ovchinnikov Viktor Vasilyevich

*Doctor of Technical Sciences, Professor, Head of Department
Moscow Polytechnic University*

Yakutina Svetlana Viktorovna

*Candidate of Technical Sciences, Associate Professor
Moscow Polytechnic Institute*

Uchevatkina Nadezhda Vladimirovna

*Candidate of Chemical Sciences, Associate Professor, Researcher
Moscow Polytechnic University*

Annotation. *The process of argon-arc welding of metal composite materials based on immiscible components Al–30Be–5Mg and 50Fe–50Cu by non-consumable electrode has been investigated. It has been established that during welding of plates 2.0–3.0 mm thick with through penetration, the structure of weld metal has a morphology similar to the base material. High-quality structures of the weld and near-weld zone on the Al–30Be–5Mg material were obtained at a welding speed of 24 m/h, filler wire feed and concomitant heating to a temperature of 7730K. The 50Fe–50Cu material is satisfactorily welded by argon-arc welding at optimal modes, which ensures sufficient mechanical properties for operation.*

Keywords: *arc, welding, technology, composite, structure, properties.*

The results presented in the article were obtained within the framework of the project under State Assignment No. FZRR-2023-0005 “Development of fundamental technological principles for the use of concentrated energy flows to obtain new import-substituting composite materials for special purposes based on systems of immiscible components”.

Metal composite materials based on immiscible components find a variety of applications in both unique and traditional industrial products [1, 2]. However, many parts are composite and require joining them together using fusion welding methods [3]. Among the variety of fusion welding methods, the most common and economical is arc welding [4]. However, the use of this widespread method for

joining a number of metal composite materials is associated with difficulties due to their unusual structure and reaction to the action of a concentrated heat source [5, 6].

The aim of this work was to study the technological features of argon-arc welding with a non-consumable electrode of composite materials Al–30Be–5Mg [7] and 50Fe–50Cu [8] with a thickness of 2.0–3.0 mm.

Arc welding was performed using a Fronius TPS 5000 DC source with a maximum current of up to 500 A and a TIG WGT-17V welding torch with a tungsten non-consumable electrode (TCE). Since the matrix of these composite materials is mainly made up of easily oxidizable elements (Al, Be, Cu, etc.), argon gas is used for protection, which is supplied to the welding zone together with the arc.

When fusion welding composite materials of the Al–Be–Mg and Fe–Cu systems, irreversible metallurgical and phase transformations occur, affecting the properties previously incorporated into these materials during their production [9]. This puts forward certain requirements for the development of rational modes and methods of argon arc welding.

The structure and properties of welded joints recorded after welding are formed as a result of the combined occurrence of two processes: the primary release of hardener particles during cooling and the subsequent crystallization of the liquid matrix.

The main requirements for argon arc welding (ArAW) technology are based on the nature of the changes occurring in the weld melt and in the weld zone, which determine the structure and properties of the resulting welded joint [10].

An important stage of the technology is the preparation of the edges for welding. The original Al–30Be–5Mg material always has an oxide film, which must be removed before welding. The best results are achieved by etching in a solution of $\text{HNO}_3 + \text{NaF}$, followed by scraping immediately before welding. The 50Fe–50Cu material must be cleaned with a metal brush until shiny.

The choice of argon-arc welding (AAW) modes for Al–30Be–5Mg material is based on the analysis of the dependence of crystallization patterns on the linear energy of welding, which accordingly determines the properties of the weld.

The microstructure of the weld completely preserves the morphology of the main composite material, but has some features. Due to the significant difference in the temperatures of crystallization and complete melting of the material (up to 100%), the crystallization process begins with the release of beryllium crystallites, the growth of which continues up to the crystallization temperature of the aluminum matrix. Moreover, in the entire range of particle release and growth, the amount of liquid phase is 30-50 volume percent for different compositions.

In fusion welding conditions, structure formation is determined by the rates of cooling and movement of the crystallization isotherm, as well as the temperature

gradient near this isotherm. The specified values change depending on the mode and location in the weld. The sought parameters are estimated by determining the trajectory of movement of the solidification front point and the crystallization rate V_{cr} of the weld along it when the pool is shifted in the welding direction.

It was found that welding at a fairly low speed of 3.6 m/h is characterized by the proximity of crystallization parameters within the weld and their low absolute values, as a result of which large, randomly located beryllium particles are formed in the structure.

With an increase in the welding speed to 7.0 m/h, the calculated crystallization rate in the central sections of the weld increases significantly. The formation of beryllium plates oriented relative to the solidification front and located almost parallel to each other is observed on the structure. Such a structure can be called pseudo-eutectic.

A further increase in the welding speed due to an increase in the crystallization rate promotes dispersion of beryllium particles and a reduction in the distance between them. At a welding speed of 16 m/h, some anomaly is observed. In the central sections of the weld, the orientation of the structure disappears and a dispersed mixture of the matrix and beryllium particles of insignificant sizes is recorded with a distance between them commensurate with their thickness.

This structure can be explained by a very high crystallization rate in combination with a high cooling rate, which enables the independent nucleation of numerous crystals as a result of highly developed concentration supercooling. When the welding speed is increased to 32 m/h, the direction of the beryllium particle arrangement is restored again, which is determined by a change in the outline of the crystallization isotherms from parabolic to conical.

Thus, it is obvious that with the same composition of the composition within the melting zone of very limited dimensions, it is possible to form various structures with variable process characteristics.

If it is necessary to increase the strength of the joint to the level of the base metal, it is necessary to use welding with filler wire. For welding the Al–30Be–5Mg material, the filler wire SvAMg63 and SvAK5 with a diameter of 2.0 mm, which do not contain beryllium, as well as the wire ABM-1 (composition Al–30Be–5Mg) were used. The best weld formation was obtained in optimal modes with a filler of the AMB-1 material.

The tests were carried out with weld reinforcement and with the reinforcement removed. As can be seen from Table 2, in the case of welds with reinforcement, the ultimate strength of welded joints is at the level of 0.98 of the strength of the base material when using filler wire made of ABM-1 material. With the reinforcement removed, the strength is comparable with the ultimate strength when welding without filler and corresponds to the ultimate strength of the weld metal.

Filler wires SvAMg61 and SvAK5 provide strength in the range of 0.9–0.95 of the strength of the base metal, but the plasticity of these joints is somewhat higher than the corresponding values of the base metal. Heating, although it reduces the size of the beryllium-enriched zone, does not have a significant effect on the strength and plasticity of welded joints.

Thus, it has been experimentally shown that for welding the Al–30Be–5Mg material, both standard aluminum additives, which are significantly cheaper, and additives from materials containing beryllium can be used. In the latter case, the stability of the process increases, and higher mechanical properties of welded joints are achieved.

When studying the microstructure of welded joints, it was found that a beryllium-enriched zone is preserved in the weld-affected zone, but the density of beryllium particles in this case is significantly lower than when welding without filler metal. The microstructure of the weld obtained with the ABM-1 filler metal contains a larger number of beryllium particles than in the case of using the SvAMg61 and SvAK5 filler metals.

Welding of 2.0 mm thick plates made of 50Fe–50Cu material was carried out with through penetration in the following mode: arc current $I = 120$ A; arc voltage $U_d = 12$ V; welding speed $V_{sv} = 15$ m/h. The seams had a shiny, non-oxidized surface. The formation of seams was uniform both from the surface and at the root of the seam.

Microstructure analysis showed that the remelting zone does not differ in morphology from the base material in the arrangement of iron particles in the copper matrix, only the dispersion of the material components changes. Inclusions of the iron component have an equiaxed shape with a size of 10–30 μm . Near the boundaries with the base metal, in the melting zone, conditions are created for the formation of columnar iron inclusions up to 10–200 μm long, oriented perpendicular to the crystallization boundary. Interlayers of the copper phase, free of iron inclusions, in cross-section are 5–10 μm and have a complex branched configuration.

Mechanical tests of welded samples of the 50Fe–50Cu composition welded without filler wire showed the following. The tensile strength is at least 0.8 of the strength of the base metal. In all cases, the rupture occurred along the weld. The impact toughness was also at least 0.85 of the impact toughness of the base metal. The ductility of the welds, estimated by the bending angle and relative elongation, was at the level of the base material. The microhardness of the weld metal was higher than the hardness of the base metal.

Thus, as a result of the conducted research, it was established that the connection by the method of argon-arc welding with a non-consumable electrode of composite materials Al–30Be–5Mg and 50Fe–50Cu, obtained on the basis of immiscible components, allows obtaining high-quality welded joints with strength at the level of the base material.

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CONNECTED STATES IN THEIR OWN FIELD

Chikhachev Alexandr Sergeevich

*Doctor of Physical and Mathematical Sciences, Leading Researcher
All-Russian Electrotechnical Institute - Branch of the All-Russian
Research Institute of Technical Physics named after E.I. Zhababkhin*

Abstract. *The states of a quantum system characterized by a negative value of the square of the moment are considered. An important particular solution is found, in which the charge density does not depend on angles, i.e. is spherically symmetric. In this case, stationary states are possible, in which the repulsive force from the proper charge is balanced by the inertial force, directed toward the center of the system with a negative value of the square of the moment.*

Introduction. *In classical mechanics, the angular momentum is a real quantity and negative values of the square of this quantity have no physical meaning. However, in quantum mechanics the situation is different - if the orbital moment is $l = -1/2$, then the square of the moment is $L = -1/4$. This circumstance means that the inertial force acting on the charge is directed toward the center of the system. With a spherically symmetric charge distribution, an equilibrium state is possible in which the inertial force is balanced by the repulsive force from the self-charge. Further in the work, this possibility is studied.*

Issues related to the study of states in which the interaction of charges with the self-field plays a significant role were studied in the works [1], [2].

Keywords: *Schrödinger equation, orbital moment.*

Stationary system in the self-field

The Schrödinger equation in spherical coordinates has the form:

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2m} \left(\frac{\partial^2 \Psi}{\partial r^2} + \frac{2}{r} \frac{\partial \Psi}{\partial r} - \frac{\hat{L}}{r^2} \Psi \right) + U(\vec{r}, t) \Psi(\vec{r}, t), \quad (1)$$

Here

$$\hat{L} = \frac{1}{\sin \theta} \frac{\partial}{\partial \theta} \sin \theta \frac{\partial}{\partial \theta} + \frac{1}{\sin^2 \theta} \frac{\partial^2}{\partial \varphi^2}.$$

Next we will look for a particular solution in which $\Psi = \psi(r, t)Y(\varphi, \theta)$.

In this case $\hat{L}Y = -LY$, где $L = l(l+1)$ - square of the total moment.

In this section, we solve a stationary problem, U which is determined by its own charge and does not depend on time, and we will also represent the potential as a product: $U(\vec{r}) = V(r)\Delta(\theta, \varphi)$. At $L = -\frac{1}{4}$ we get:

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2m} \left(\frac{\partial^2 \Psi}{\partial r^2} + \frac{2}{r} \frac{\partial \Psi}{\partial r} - \frac{\Psi}{4r^2} \right) + \Delta V(r)\Psi(r, t), \tag{2}$$

The equation for the potential includes the charge density Q . In the case of interaction with the proper field $Q = -\mu |\Psi|^2 = -\mu |\psi|^2 |Y|^2$, μ – coupling constant, and Y satisfies the equation:

$$\frac{1}{\sin \theta} \frac{\partial}{\partial \theta} \sin \theta \frac{\partial Y}{\partial \theta} - \frac{1}{4} Y + \frac{1}{\sin^2 \theta} \frac{\partial^2 Y}{\partial \varphi^2} = 0. \tag{3}$$

Instead of a variable θ let's introduce $\eta = \ln\left(\frac{\theta}{2}\right)$, then the equation takes the form:

$$\text{ch}^2 \eta \left(\frac{\partial^2 Y}{\partial \eta^2} + \frac{\partial^2 Y}{\partial \varphi^2} \right) = \frac{1}{4} Y. \tag{4}$$

Next we will take into account the spinor nature of the Ψ -function and represent Y in the form of a column:

$$Y = \sqrt{\Omega(\eta)/2} \exp(if(\eta)) \begin{pmatrix} \exp\left(\frac{i\varphi}{2}\right) \\ \exp\left(-\frac{i\varphi}{2}\right) \end{pmatrix}, \text{ where } \Omega(\eta), f(\eta) - \text{real functions respec-}$$

tively Y^- - is a line $Y^+ = \sqrt{\Omega(\eta)/2} \exp(-if(\eta)) \left(\exp(-i\varphi/2), \exp(i\varphi/2) \right)$.

The projections of the moment onto the coordinate axes have the form: $M_x = Y^+ \sigma_x Y = \Omega \cos \varphi, M_y = Y^+ \sigma_y Y = \Omega \sin \varphi, M_z = Y^+ \sigma_z Y = 0$. The dependence of density on angles is determined by the product $Y^+ Y$ and, with the chosen representation, does not depend on the angle $\varphi: Y^+ Y = \Omega(\eta)$. Therefore, the potential U also does not depend on φ .

Using the variable η instead θ we get:

$$\Delta(\eta) \frac{1}{r^2} \frac{d}{dr} r^2 \frac{dV(r)}{dr} + \frac{V(r)}{r^2} \text{ch}^2(\eta) \left(\frac{d^2 \Delta}{d\eta^2} \right) = Q. \tag{5}$$

Complete separation of the radius function from the angle function can be achieved if the following conditions are met: $\text{ch}^2(\eta) \frac{d^2 \Delta}{d\eta^2} = \nu \Delta, \nu \equiv \text{const}, \Delta \equiv Q$. From (4) we can obtain:

$$\text{ch}^2(\eta) \left(2\Omega'' \Omega - \Omega'^2 - \Omega^2 + 2if' \Omega - f'' \Omega^2 + if'' \Omega^2 \right) = \Omega^2. \tag{6}$$

Excluding from these relations $\text{ch}^2(\eta)$ we obtain the equation:

$$\Omega'' \Omega (2\nu - 1) = \nu (\Omega'^2 + \Omega^2 - 4if' \Omega \Omega' - 4if'' \Omega^2 + 4f'' \Omega^2). \tag{7}$$

By equating the imaginary part to zero, we find that $f = \frac{C_0}{\Omega}$. The equation takes the form:

$$\Omega''\Omega(2\nu - 1) = \nu(\Omega'^2 + \Omega^2 + 4C_0^2). \quad (8)$$

This equation has an integral: $C_1 = \Omega^{-\frac{2\nu}{2\nu-1}} \left(\Omega'^2 + \frac{\nu}{1-\nu} \Omega^2 + 4C_0^2 \right)$.

Let's introduce the definition: $S = \Omega^{\frac{\nu-1}{2\nu-1}}$. Then $C_1 = S'^2 \left(\frac{2\nu-1}{\nu-1} \right)^2 - \frac{\nu}{\nu-1} S^2 + 4C_0^2 S^{\frac{\nu}{\nu-1}}$.

From this ratio, the dependence can be determined $S(\eta)$, however at $\nu = \frac{1}{2}$ there is a particular, special solution $\Omega = S^0 \equiv 1$ also follows from this: $\Delta \equiv 1$ and and that the charge density distribution is spherically symmetric. From (5) follows the equation:

$$\frac{1}{r^2} \frac{d}{dr} r^2 \frac{dV}{dr} + \frac{1}{2} \frac{V}{r^2} = -\mu |\psi|^2. \quad (9)$$

In equation (2) we make the following substitution:

$$\psi = \exp\left(-\frac{iEt}{\hbar}\right) R(r) e^{i\theta(r)} \quad (10)$$

where E is a real value,

$R(r), \theta(r)$ - real functions. We obtain the system:

$$ER = -\frac{\hbar^2}{2m} \left(R'' - R\theta'^2 + \frac{2R'}{r} + \frac{R}{4r^2} \right) + RV, \quad (11)$$

$$2\theta' \frac{R'}{R} + \theta'' + \theta' \frac{2}{r} = 0. \quad (12)$$

From (12) it follows that $r\theta'R^2 \equiv const = C_0$, i.e. $\theta' = \frac{C_0}{rR^2}$. Instead r let's introduce a dimensionless variable $s: r = r_0 s, r_0^2 = \frac{\hbar^2}{2mE_0}$, constant μ has the form: $\mu = \frac{e^2}{4\pi r_0 E_0} = \frac{e^2}{4\pi \hbar} \sqrt{\frac{2m}{E_0}}$

where e is the elementary charge, E_0 arbitrary unit energy. In dimensionless variables the system takes the form:

$$R'' + \frac{2R'}{s} + \frac{R}{4s^2} - \frac{C_0^2 R}{(sR^2)^2} = (V(s) - E)R, \quad (13)$$

$$\frac{d^2 V}{ds^2} + \frac{2}{s} \frac{dV}{ds} + \frac{1}{2} \frac{V(s)}{s^2} = -\mu R^2. \quad (14)$$

This system can be supplemented by an equation for $q(s)$, the total charge inside a sphere of dimensionless radius s:

$$\frac{dq}{ds} = 4\pi R^2 s^2. \quad (15)$$

Let's introduce new variables: $R = \sqrt{u(s)}, t = s^2$. We get the system:

$$\ddot{u}(t) + \frac{3\dot{u}}{2t} - \frac{\dot{u}^2}{2u(t)} + \frac{u}{8t^2} - \frac{C_0^2}{2t^2u} = \frac{V-E}{2t}u(t), \tag{16}$$

$$\ddot{V} + \frac{3\dot{V}}{2t} + \frac{V}{8t^2} = -\mu \frac{u}{4t}. \tag{17}$$

Initial conditions: $V(0) = 0, u(0) = u_0 = 2C_0, \dot{V}(0) = -\mu u_0 8/13$.

The equation for the total charge now looks like:

$$\dot{q}(t) = 4\pi \frac{u(t)}{2} \sqrt{\tau + t}, \tag{18}$$

where the presence $1 \gg \tau > 0$. ensures the possibility of conducting the calculation.

Let us present the solution of this system for different values of the parameters E, C_0 . Fig. 1 shows the results of calculations for $E = 0, C_0 = 2$, in this case $u(0) = 4, \dot{V}(0) = -8/13, \dot{u}(0) = 0, V(0) = 0, q(0) = 0$ In Fig.2 the results of the solution of the system at $E = -5, C_0 = 0.5$. The initial conditions in this case are $u(0) = 1, \dot{u}(0) = 10/7, V(0) = 0, \dot{V}(0) = -2/13, q(0) = 0$. In both Fig. 1 and Fig. 2, curve I is $100u(t)$, curve II is the potential $10V(t)$, curve III - charge $q(t)/40\pi$.

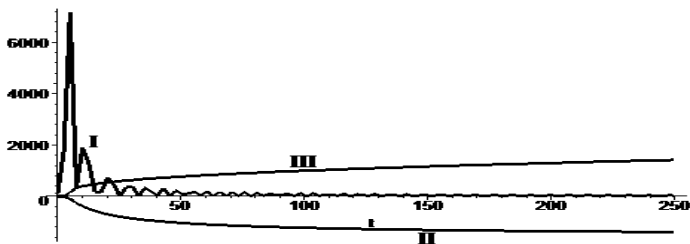


Figure 1. Dependence of potential, charge density and total charge on the t at $E = 0, C_0 = 2$.

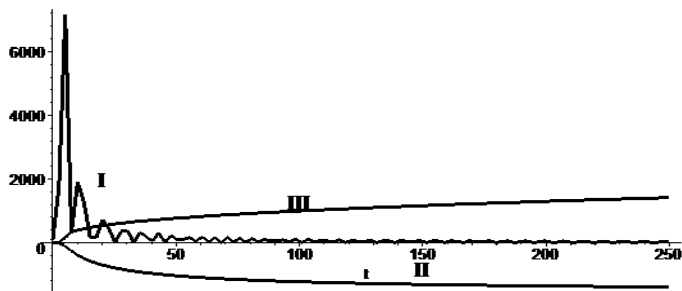


Figure 1. Dependence of potential, charge density and total charge on t at $E = -5, C_0 = 0.5$.

Let us compare these results with the case when $l = +\frac{1}{2}, L = +\frac{3}{4}$.

In this case, it turns out, $\nu = -\frac{3}{2}$, and the system of equations takes the form:

$$\ddot{u}(t) + \frac{3\dot{u}}{2t} - \frac{\dot{u}^2}{2u(t)} - \frac{3u}{8t^2} - \frac{C_0^2}{2t^2u} = \frac{V-E}{2t}u(t), \tag{19}$$

$$\dot{V} + \frac{3\dot{V}}{2t} - \frac{3V}{8t^2} = -\mu \frac{u}{4t}. \tag{20}$$

In this case, a solution of the type is impossible $u(0) = \text{const}C_0$, where *const* - the real value as in the previous case, and from general ideas there is no solution to this system, since there is no stationary state.

We will also give a solution to the system (13), (14), (15) in the case $C_0 = 0$.

Let's introduce the function R_1 , having put $R(s) = \frac{R_1}{\sqrt{s}}$,

$$R_r + \frac{R_1(s)}{s} = (V(s) - E)R_1(s), \tag{21}$$

$$V''(s) + \frac{2}{s}V'(s, s) + \frac{V(s)}{2s^2} = -\mu \frac{R_1^2}{s}, \tag{22}$$

$$q'(s) = 4\pi R_1^2 s \tag{23}$$

The initial conditions for this system are: $R_1(0) = 1, R_r(0) = 0, V(0) = 0, \frac{5}{2}V'(0) = -\mu R_1(0)^2$. The solution under these initial conditions and at $E = 200, \mu = 1$ shown in Fig.3. The variable used is $\sigma = \sqrt{E}s$. Curve I is $R_1(\sigma) = J_0(\sigma)$ where J_0 - Bessel function of zero order, curve II - dependence $q(\sigma) = 4\pi ER_1\sigma$, III - potential curve $10V = 10\sqrt{EV}(\sigma)$.

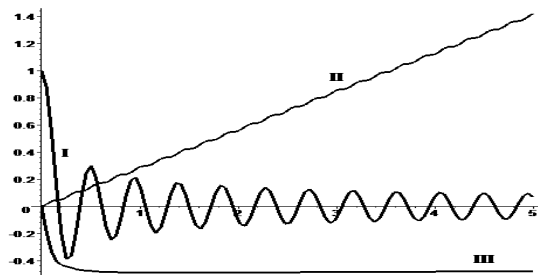


Figure 3. Potential dependence $R_1(\sigma)$ curve I, potential $10V(\sigma)\sqrt{E}$ curve II and full charge $q(\sigma) = 4\pi ER_1\sigma$ curve III, at $E = 200$

Using the asymptotic expansion of the Bessel function for large values of the argument, we obtain $J_0^2(\sigma) \approx \frac{1}{\pi\sigma}$. Substituting this expression into (23) shows

that the total charge q increases linearly with increasing σ , and the potential V at sufficiently large σ satisfies the relation: $V(\sigma) \approx const = V_0 = -\frac{\mu}{\pi}$. These results are shown in Fig. 3.

Let's note that states with a non-integer value of the moment were studied in [2].

Conclusion

Thus, the paper shows the possibility of a state with a spherically symmetric charge density distribution at $l = -\frac{1}{2}$. The force directed towards the center of the system with a negative value of the square of the moment can be compensated by the force from the side of its own charge.

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COMPREHENSIVE SYNERGETIC TECTONICS TO REPLACE PLATE TECTONICS.

(Substantiation of the new concept with modern geophysical and geological data)

Doundo Oleg Pavlovich

*Doctor of Geological and Mineralogical Sciences, Chief Researcher
Scientific Research Institute of Geology and Mineral Resources of the
World Ocean named after Academician I.S. Gramberg,
Saint Petersburg, Russia*

Annotation. *The results of a comprehensive analysis of new geological and geophysical data on the geology and geophysics of the world are presented. A brief list of facts incompatible with plate tectonic constructions and requiring the development of a new tectonic hypothesis is given. Given a brief description of the essence of the proposed hypothesis is entitled “Comprehensive Synergetic Tectonics”. Its main provisions are formulated.*

Keywords: *geological and geophysical maps of the World, primary earth’s crust, newly formed earth’s crust, formed geostructures, forming geostructures, spreading, swelling, synergetics.*

One of the most important scientific areas of geology is tectonics (geotectonics), which studies the structure and development of the earth’s crust as a result of movements caused by various processes occurring in the bowels of the Earth, synthesizing and generalizing, at the same time, data from many other disciplines of geological science.

The currently prevailing hypothesis of plate tectonics in geology (called a theory by its adherents) replaced the previously established ideas only in the second half of the last century, with the beginning of a wide turn of oceanographic and complex marine geological and geophysical research. Before the appearance of plate tectonics in the world geological community, the generally accepted tectonic concept was the geosynclinal-platform hypothesis (V.V. Belousov; R.V. van Bemellen), based mainly on the results of centuries of research into the geological structure of continents and island land. The bottom of the World Ocean, occupying 70% of the Earth’s surface, remained “terra incognita” in the geology of that time.

At the first stage of development of plate tectonic constructions, they were more of a “remake” of A.L. Wegener’s hypothesis (a century old) about the spreading of continents than a new concept, and only in the 80s of the last century did they take shape in the modern tectonics of lithospheric plates, dividing the world’s geologists into two opposing groups – “fixists” and “mobilists”, whose active and tough discussions continued until the 2000s of the 21st century, until they died down, without revealing a winner.

Since the 1970s, the active work of the supporters of lithospheric plate tectonics has significantly revived marine expeditionary research, which has yielded a huge array of new oceanographic, geological and geophysical scientific data. The systematic processing of new materials and the contradictory conclusions arising from their analysis have led to the resumption of heated debates between the opposing supporters of “fixism” and “mobilism” (an example of this is the monograph by Professor V.B. Karaulov [9]). In these debates, along with numerous other issues, attention was focused on several fundamental circumstances:

- the inconsistency of asserting the plate tectonic concept as a geological theory without substantiating it with geological practice

- denial by plate tectonics of the results achieved by centuries of research by predecessors, and the “deaf” obstruction of fundamental facts revealed in recent years by geological and geophysical work, but contradicting the provisions of tectonics of lithospheric plates

- in modern scientific and industrial works, there have been frequent cases of replacing an in-depth analysis of real factual material with a formal set of various installations from the plate tectonic concept (the reason for the folding of the studied deposits is the collision of adjacent plates without substantiation of their presence; searches for elements of geohistorical events in a set of conceptual installations of the discussed concept: island arcs, back-arc basins, continental slope facies, etc.

Is it not time, based on what has been said, to raise the question of replacing the concept of lithospheric plate tectonics with a new hypothesis that avoids these unfavorable circumstances? It is time, since the results of the analysis of new geological and geophysical data accumulated over the past few decades indicate that:

- oceanic (by genesis) earth’s crust, as such, does not exist;

- the planet has only 2 types of earth’s crust (EC), characterized in potential fields: a) linear-mosaic morphotype of anomalies (characteristic of continents), and b) linear-band morphotype of anomalies (characteristic of oceans);

- there are no transitional types of EC, there are only variations of varieties in each of the two named types;

- the earth’s crust is not formed by the spreading mechanism, as postulated by the plate tectonic concept;

- at each specific stage of the planet's evolution, a certain complex of diverse geological processes dominated, constituting the essence of almost all tectonic concepts put forward by previous generations of geologists, despite the fact that these concepts were rejected by plate tectonics.

This means that the fundamental principles of the tectonic concept, which currently dominates in geology, are in conflict with newly obtained factual data and there is a need to develop a new tectonic hypothesis.¹

It is clear that such a categorical statement requires specific argumentation based on a thorough examination of the conclusions arising from the analysis of a vast array of new geological and geophysical materials.

List of new factual data incompatible with plate tectonic constructions

Below is a chain of new, logically linked geological and geophysical facts that lead to the conclusion that the plate tectonic concept is untenable or (at least) to reasonable doubt about its correctness.

1. Results of the analysis of relatively recently published maps of anomalous potential fields of the World [12,14]. The first thing that attracts attention when examining them is the presence of two morphologically sharply different types of anomalous fields (morphotypes), both magnetic and gravitational (Fig. 1 "A" and "B"). One of them is represented by various combinations of linear-mosaic anomalies, the other - strictly linear narrow strip anomalies.

In the magnetic field, stripe anomalies are parallel to the axial line of mid-ocean ridges; in the gravitational field, they are orthogonal to this line.

In principle, each morphologically expressed anomalous field reflects the features of the structure and material composition of the corresponding geological formations (bodies). In this case, the two named morphotypes of potential fields are an indication of the presence of two types of crust (TCE) on the Earth with different characteristics of material composition and structure. This is also evidenced by the fact that the location and contours, as well as the sizes of the areas of both magnetic and gravitational strip anomalies, completely coincide (Fig. 1).

The crustal crust, represented in potential fields by various combinations of linear-mosaic anomalies (as can be seen in Fig. 1), is typical for continents. It has been well studied over the centuries-long history of geological research, has a large thickness (30-70 km) and is represented by an Archean-Proterozoic granite-metamorphic complex, covered by a Phanerozoic sedimentary stratisphere, in places partially transformed into folded systems. In the literature, this type of crust is traditionally called "continental crust".

¹ The main provisions of the proposed new hypothesis were published by the author in [materials](#) 51st and 52nd meetings of the ITC [6, 7, 8].

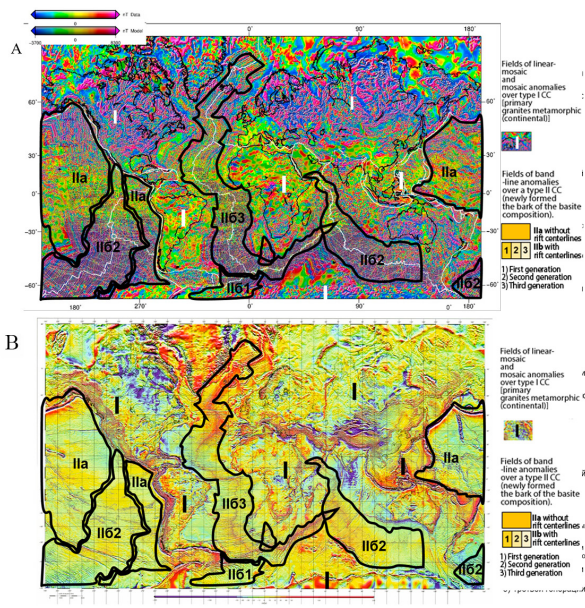


Figure 1. Maps of the magnetic “A” and gravitational “B” anomalies of the World with the contours of two types of the Earth’s crust applied to them.

The crust with a linear-band morphotype of potential fields (Fig. 1 “A”) became known as “oceanic crust” only in the middle of the last century, when intensive oceanographic and geological-geophysical studies began in the waters of the World Ocean. Thanks to these studies, mid-ocean ridges and their inherent linear-band magnetic and gravitational anomalies were discovered. This type of crust is characterized by a relatively small thickness (5-15 km), Meso-Cenozoic basic substrate, covered by a volcanogenic-sedimentary stratisphere. The sharp difference in the thickness of the crust of these two types becomes easily understandable: after all, the first was formed over billions of years, and the second only hundreds of millions.

Summary: plate tectonics not only does not consider the fact of the presence in anomalous potential fields of two morphotypes that characterize the features of the planet’s crust, but does not even turn to the analysis of already published maps in its constructions. The authors of the concept immediately declare the thesis about the expansion of the oceanic crust (spreading) as a mechanism for the evolution of the crust as a whole.

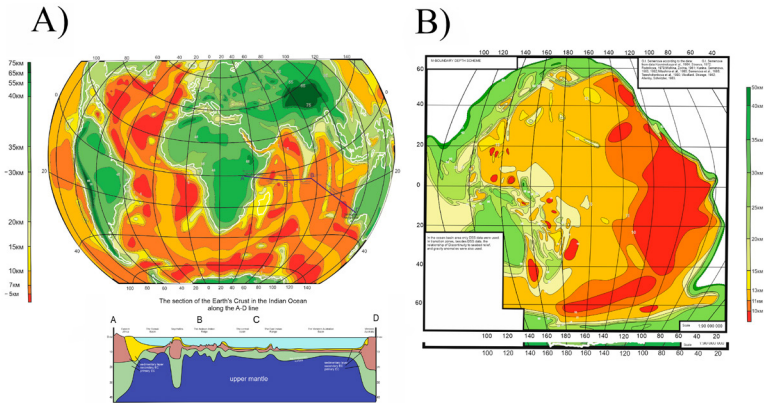


Figure 2. Depth maps of the “M” section of the Indo-Atlantic (A) and Pacific (B) hemispheres

2. Comparison of Fig. 1 and Fig. 2 reveals a connection between deep geophysical heterogeneities and upper crustal tectonic structures. Areas with linear-mosaic (formed continental structures) and linear-band (forming ocean floor structures) morphotypes of potential field anomalies completely coincide with areas of sharply different types of surface relief “M”: the former correspond to vast areas of “deep” (more than 45 km) lowlands, the latter - linear, comparatively narrow high (less than 7 km) “mountain” belts, cutting the total area of lowland plains into separate parts.

Abstract: Plate tectonics does not take into account this important fact of the relationship between surface structures and deep heterogeneities.

3. The “oceanic” crust (in the sense of plate tectonics) does not cover the entire area of the deep-sea floor of the World Ocean. Back in the early 60s of the last century, scientists from the Arctic Geology Research Institute discovered that in the Eurasian basin of the Arctic Ocean (AO), the crust is characterized by linear-banded, and in the Amerasian basin - by linear-mosaic morphotypes of potential fields. That is, the deep-sea floor of two different parts of a single ocean is lined with crust of two different genetic types - “oceanic” and continental. At that time, this paradox did not receive a proper explanation. In the 2010s, the American geologist Keith James, analyzing a new map of magnetic anomalies of the world [12], provided evidence (Fig. 3) of an equal ratio of the areas of the two types of crust in the southern part of the Atlantic Ocean floor. If we remove the area with linear strip anomalies (“oceanic crust”) from fragment “B” of the real map of the World, then fragment “A” will show that the remaining part of the oceanic bed

(approximately equal in size to that removed from fragment “B”) is lined with continental crust, which unites the South American and African continents. At the same time, K. James emphasized the geopolitical significance of the fact he discovered for coastal countries to justify the boundaries of their exclusive economic zones in coastal waters.

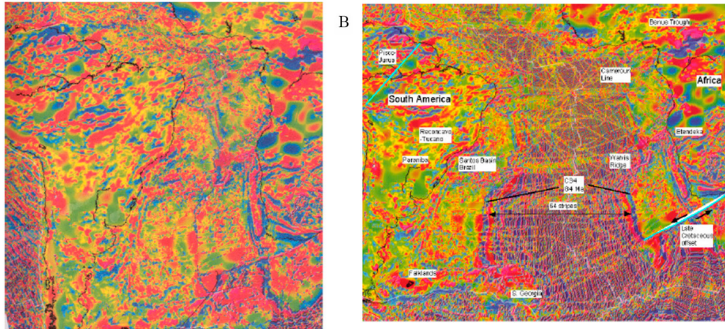


Figure 3. Fragments (A and B) of the map of magnetic anomalies of the World from the southern part Atlantic Ocean

The analysis of the maps of the potential fields of the World mentioned at the beginning of this article (Fig. 1 “A” and “B”) shows that a similar ratio of two types of EC is characteristic of all the oceans of our planet, with the exception, perhaps, of the Pacific Ocean.

Since the crust with a linear-band morphotype of anomalous potential fields does not cover the entire bed of the World Ocean, the established name of the crust “oceanic” cannot be considered correct. Moreover, in the descriptions of the core of many deep-sea wells drilled under international programs, information is given on the subaerial weathering of “oceanic” basalts, on the layers of eluvial collapses of basaltic debris at the base of the sedimentary strata lying above.

Taking into account the above, as well as (see text of paragraph 1) the sharp difference in age, thickness and material composition of the two types of EC considered above, it seems appropriate to call them henceforth not continental and oceanic, but primary and secondary, respectively.

Summary: the existence of the two types of EC described above should be recognized as an indisputable fact, substantiated by geological and geophysical factual data, to which the supporters of both “fixism” and “mobilism” will not object. There are no transitions between these two types of EC. There are only varieties in each of them, expressed by a set of geostructures inherent to them: on the continents these are platforms, folded systems, continental shelf margins, large basins with a thick sedimentary cover, similar to the West Siberian Plate.

etc.; in the oceans these are global rift systems or vast fields of riftless secondary crust (in the Pacific Ocean).

4. The secondary EC (linear-band morphotype of potential fields) is not the result of a single-act permanent geodynamic process (spreading in plate tectonics). It was formed, apparently, in several stages over the course of, possibly, the entire Phanerozoic. This conclusion follows from the analysis of the “Magnetical Linearity Map of Ocean Basins” published in 1989 [13], compiled on the basis of actual magnetometric data available at that time, not biased by existing geodynamic concepts and hypotheses (Fig. 4).

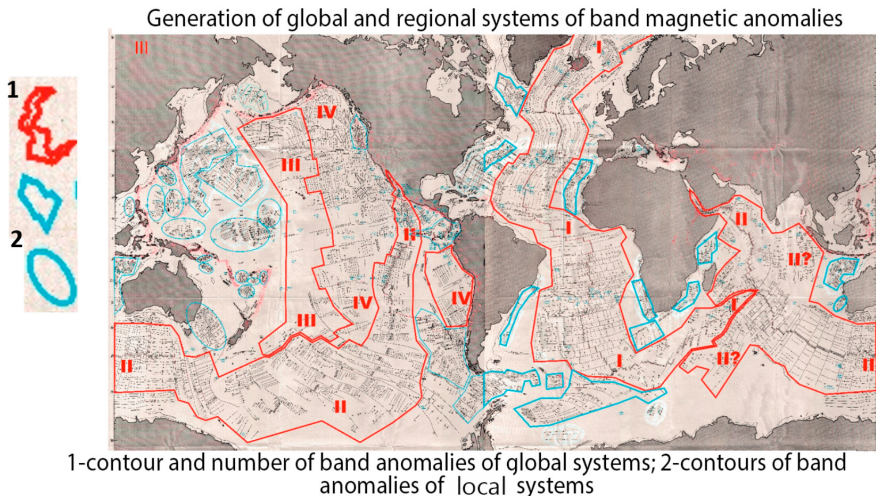


Figure 4. *Generation of global and regional systems of band magnetic anomalies in sedimentary basins of the World Ocean according to [] with additions*

In this figure, according to the nature of the relationships of geological bodies (sources of morphotypes of anomalous magnetic fields) within the global taxonomic hierarchy, several generations of linear-band anomalies of different ages are confidently distinguished, both as world rift systems (Indo-Pacific and the Indo-Atlantic superimposed on it), and as vast rift-free fields (East Pacific and West Pacific). As another independent, probably more ancient (MZ), generation, significantly smaller fields of linear-band anomalies are visible, forming clusters in the extreme northwestern part of the Pacific Ocean, and located along the outer sides of the Atlantic Ocean.

The age difference of several generations of linear-band anomalies, seen in Fig. 4, requires a radical revision of the Vine-Matthews hypothesis, and indicates the impossibility of using it, in its previous form, as a single system for identifying magnetochrons. in the World Ocean. Moreover, in plate tectonic constructions one

important circumstance is completely ignored, clearly shown in the objectively compiled figure 4: the complete absence of magnetochrons in the Indo-Atlantic rift system in a vast area located between the parallels of 16 degrees north latitude and 14 degrees south. Meanwhile, it is precisely in this area (see Fig. 5) that relics of another generation (apparently the most ancient) have been preserved, which is characterized by a morphotype of linear-band anomalies, represented by a very frequent alternation of very narrow latitudinal-oriented magnetochrons, which are not found anywhere else in this system.

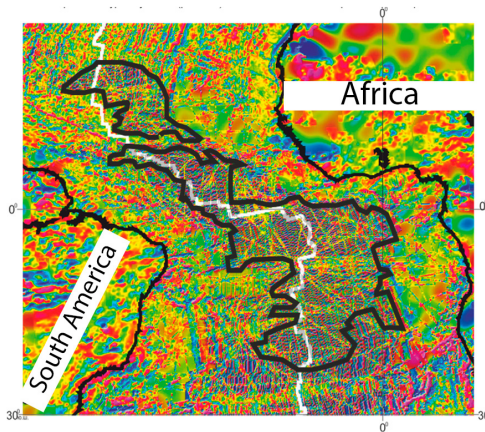


Figure 5. A field of transformed meridional band anomalies in the equatorial part of the Atlantic with relics (in black contours) of sites of ancient generation of linear thin-band anomalies of latitudinal orientation.

Plate tectonics completely ignores another real parameter characterizing the properties of secondary EC in potential geophysical fields. We are talking about gravitational strip anomalies, orthogonally oriented with respect to the axial lines of rifts, and located in exactly the same areas on the Earth's surface as magnetic linear-strip anomalies (compare Fig. 1 "A" and "B"). Geodynamic reasons for both the appearance of "strip gravity" and its orthogonal orientation in plate tectonics are not considered at all.

The problem of fragmentation of potential fields (Fig. 6) of the secondary EC is not considered, while the morphotypes of gravitational and magnetic anomalies of each fragment are sharply different. And this means that the entire set of fragments of a single rift system was not formed at the same time. Each fragment was formed in its own chronological interval of the overall time of the system's formation, different from the others.

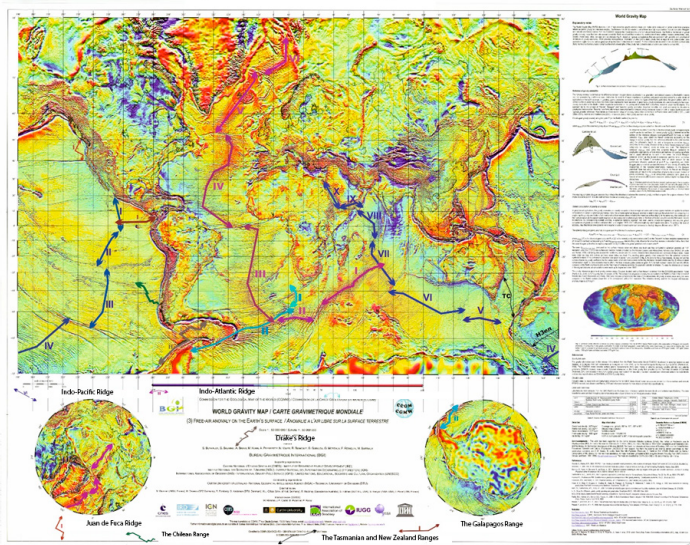


Figure 6. Diagram of the segmental structure of the mid-ocean ridges

Gravity strip anomalies, orthogonally oriented with respect to the axes of rift systems, are interpreted in plate tectonics as transform faults. On the maps [12,13,14] in the Indo-Atlantic and Indo-Pacific rift systems they are read not as transform faults, but as ordinary shifts formed later than magnetochron lines, and in each fragment, they consistently shift them (together with sections of the axial lines of the rifts) in the western direction, which may be associated with the geodynamic mechanisms of the rotational hypothesis, rejected by supporters of plate tectonics.

Summary: the above circumstances deprive the Vine-Matthews hypothesis of universality not only in relation to the Indo-Atlantic and Indo-Pacific rift systems (as well as in the study of all other areas of development of the secondary rift system), but also destroy the very concept of tectonics of lithospheric plates as such.

5. Map of global geostructures (Fig. 7), compiled on the basis of the Geological Map of the World [5] by transformations of geological taxa, in tectonic.

This map clearly demonstrates the presence of two categories of super-order structures in the Earth's crust on the planet, represented by different-aged and genetically heterogeneous geostructures of demolition areas (continental and island land) and sedimentation areas (water areas of the World Ocean basin). The former belongs to the category of formed structures that have completed their development and entered the stage of destruction by denudation processes. The latter form the category of structures in the process of formation, laid on the substrate of

formed structures. They continue to develop at the present time; their evolution should end in some geological future with a transition to the category of formed structures.

In the category of formed structures includes platforms, folded and island arc systems, and volcanic belts.

Emerging structures are represented by large sedimentary basins developing on plate blocks of the waters of the World Ocean and its marginal and internal seas.

Summary: in plate tectonic constructions, the problem of dividing geostructures into formed and forming ones is not touched upon at all, although it inevitably arises even with a cursory review of the Geological Map of the World [5].

6. *The general architecture of the planet's tectonics is characterized by the cellular structure of the earth's crust (Fig. 7).*

On land, cells are represented by stable platform cores, framed by folded mobile belts. In the folded matrix of the platform frame there are cells of the second and higher order, represented by median massifs (Prikolimsky, Omolonsky, Anadyr-Sewardsky, Bureinsky, etc.) and even smaller rigid protrusions of the crystalline Precambrian. Such rigid cores demonstrate the fractal properties of the cellular structure of the earth's crust on the continents.

In the Northern Hemisphere there is a latitudinal belt of cells with the cores of the North American-Greenland, East European, Siberian platforms and relics of the flooded Arctic Ocean, long ago the Hyperborean platform proposed by Russian scientists. Each of the named platforms is framed by a mobile belt of folded systems: Cordilleran, Appalachian, Mediterranean, Ural, Mongol-Okhotsk, Verkhoyansk-Kolyma, Arctic. The latter consists of a latitudinal belt of several of its constituent links: Vranglnev-Novosibirsk, Taimyr-Novaya Zemlya, Paikhoi, Timan-West Spitsbergen, Innuvit and Brook.

In the southern hemisphere, the cellular structure is represented by the latitudinal belt of the South American, African, Hindustani and Australian platforms, framed by a fringe of folded systems: Andean, Mediterranean-Indonesian, East Australian and Antarctic.

The oceans have a cellular structure is represented by arched uplifts of thalassocraton (core), framed by belts of mobile plates. On thalassocraton the sedimentary cover is absent or has an insignificantly small thickness. The sedimentary cover of mobile plates is several times greater than the thickness of sediments on rigid massifs of thalassocraton.

There are two cells in the Pacific Ocean - Northern and Southern, in the Indian Ocean - one - Central. In the Atlantic - three - Southern, Central and Northern. In the oceans, the cellular structure of the crust is complicated by mid-ocean ridges (MOR) with axial rift valleys.

Summary: the presence of a cellular structure of the EC does not agree with the fundamental principles of tectonics of lithospheric plates. The geodynamic processes operating within its framework cannot explain the origin of such a structure. Objective confirmation of the real existence of a cellular structure is the sharply different morphotypes of gravitational and magnetic anomalous fields: in Figures 7 and 8, the linear-mosaic morphotype of platforms is clearly visible on all sides as being enveloped by a narrow belt of a finely linear morphotype of folded systems. It is important that the cellular nature of the EC structure is identically reflected in both geological (Fig. 7) and instrumental geophysical (Fig. 8) materials.

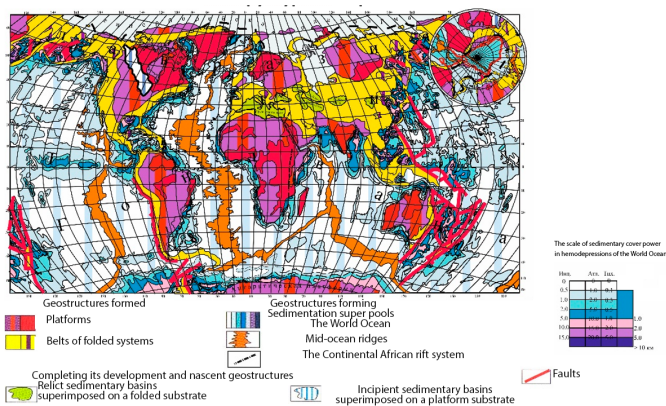


Figure 7. Global system of geostructures of the Earth

7. Analysis of the scheme of global geostructures (Fig. 7) in addition to the cellular structure of the earth's crust also reveals its latitudinal zonality. This zonality is expressed (Fig. 9)

alternation of latitudinal zones formed by:

- folded belts;
- chains of tectonically rigid platforms, surrounded by structures of folded systems, in combination with thalassocratons;
- large polar (Hyperborean and Antarctic) platforms.

In the equatorial zone of the Earth there is a latitudinal mobile, "plastic" folded belt, consisting on the continents of the Appalachian, Mediterranean and Mongolian-Okhotsk folded systems. In geological literature it is often called the "Mediterranean Alpine folded belt or Tethys". The continuation of this continental belt in the Pacific Ocean is the latitudinal belt of mobile plates, dividing the North and South Pacific thalassocratons in Fig. 5.

To the south and north of the Tethys belt are the northern and southern (see above) latitudinal belts of platforms; in the literature they are often referred to as Laurasia and Gondwana, respectively.

The latitudinal zonality of geostructures ends at the poles with vast rigid masifs of the Hyperborean and Antarctic platforms. The first is almost completely hidden under the thickness of the waters of the Arctic Ocean, the second – under the four-kilometer thickness of the South Polar glacier. Both of these platforms (Antarctic and Hyperborean) are framed by belts of mobile plates.

Summary: the latitudinal zonality of the structure of the EC considered above is also incompatible with the fundamental provisions of plate tectonics, but finds real confirmation in instrumental geophysical materials (Figs. 7 and 8).

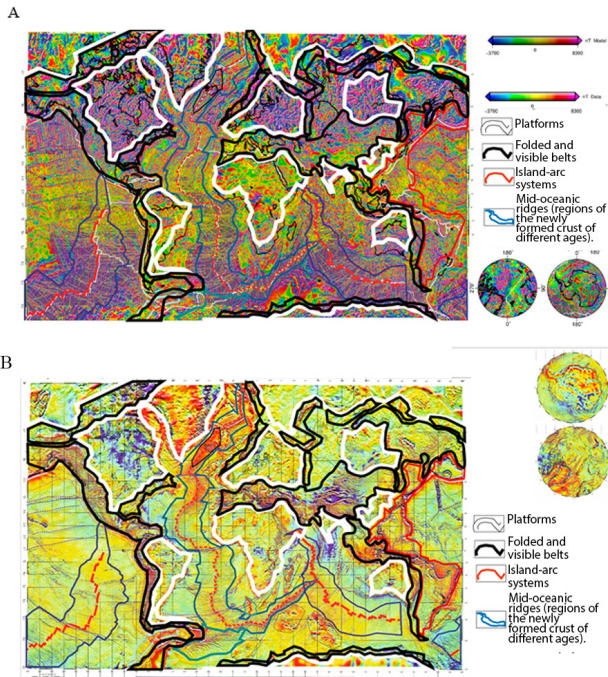
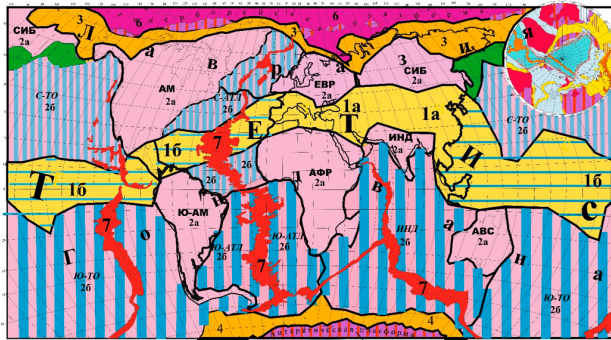


Figure 8. Maps of potential anomalies of the World (“A” magnetic, “B” gravitational) with contours of morphotypes of geostructures

Conclusions from the above critical review

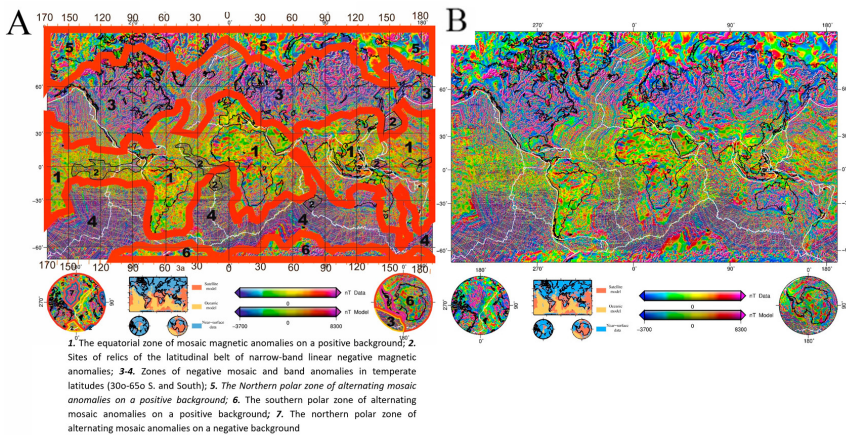
The list of discrepancies between the fundamental principles of plate tectonics and new factual data could be continued further, but it seems that the above is

already sufficient to convince us of the need to introduce significant changes into modern geotectonics, taking into account the discrepancies in the essence of plate tectonics in relatively recent publications. The fact is that in the very recent past two concepts of plate tectonics were formed, continuing their “sovereign” existence to this day. One of them, called “Classical Plate Tectonics” is considered in the article by S.V. Aplonov [1]; the other – “Tectonics of Lithospheric Plates” is characterized in the critical review by E.E. Milanovsky [10].



1. The equatorial zone of folded regions (1a) and belts of movable plates (1б)
2. Zones of platforms (2a) and thalassocratons (2б) in temperate latitudes (30-65 ° C. and South)
- 3-4. Movable belts in the north (3 - folded systems) and in the south (4 - belt movable plates) hemispheres
- 5-6. Antarctic (5) and submerged Arctic (Hyperborean) (6) platforms
7. Mid-ocean ridges

Figure 9. Latitudinal zonation of the system of global geostructures of the Earth



1. The equatorial zone of mosaic magnetic anomalies on a positive background; 2. Sites of relics of the latitudinal belt of narrow-band linear negative magnetic anomalies; 3-4. Zones of negative mosaic and band anomalies in temperate latitudes (30-65o S. and South); 5. The Northern polar zone of alternating mosaic anomalies on a positive background; 6. The southern polar zone of alternating mosaic anomalies on a positive background; 7. The northern polar zone of alternating mosaic anomalies on a negative background

Figure 10. Map of the anomalous magnetic field of the World (A) and the zoning map of the anomalous magnetic field of the World (B)

The very existence of two positions in relation to the same problem leads to the necessity of either recognizing the unreliability of one of them, or to doubting the correctness of both. The author of this article adheres to the second point of view, since the criticism expressed above deprives the plate tectonic “theory” of the possibility of its verification by geological practice, using the entire array of newly accumulated factual data.

Based on generally accepted requirements when developing any scientific problems, one should rely not on preliminary speculative constructions, but on the results of the analysis of the available array of factual material. In this case, the most optimal conclusion to the criticism of the concept of plate tectonics seems to be the advancement of a new hypothesis - “Comprehensive synergetic tectonics” - a tectonic hypothesis built on the basis of a synthesis of all previously advanced geotectonic concepts, including plate tectonics, i.e. relying on the entire invaluable baggage of scientific knowledge accumulated by previous generations of scientists. The new hypothesis removes all the critical remarks made above regarding plate tectonics.

A brief description of the essence of the proposed hypothesis.

The proposed hypothesis is based on the principles of synergetics, a new scientific discipline that studies the processes of self-organization of inanimate matter. After all, without this, it is impossible to get an answer to the very first natural question: where did our planet itself come from with its concentric-spherical internal structure, enclosed in a thin shell of the earth’s crust.

The main provisions of Comprehensive Synergetic Tectonics are as follows:

1. There are only two types of crust on planet Earth: primary, typical of continents, and secondary, inherent in oceans.
2. The appearance of the secondary ZK, previously called “oceanic”, is associated not with the spreading expansion of the sea floor, but with the swelling of the subcrustal mantle, causing a split in the primary crust and the spreading of the split blocks as the swelling (swelling) of the mantle continues (the geodynamic processes of the expanding Earth hypothesis are at work). In essence, this is the mechanism for implementing the hypothesis of A.L. Wegener, put forward a century ago.
3. The exposed mantle is overgrown with basic melts from it, forming a secondary crust. Its subsequent evolution occurs in the mode of coupled processes of ongoing basic volcanism and sedimentogenesis, generating a young stratisphere, which builds up a young secondary crust, just as the primary stratisphere built up the primary crust of the planet as a whole, beginning with the Riphean and throughout the Phanerozoic.
4. EC is an integral result of geodynamic processes considered in all hypotheses and concepts put forward by previous generations of geologists.

5. There is neither mobilism nor fixism. There is a natural sequence of the emergence of geodynamic processes in the course of the evolution of the living cosmic body of planet Earth, determined by the laws of self-organization of inanimate matter, the laws of nature, which will take many years to learn, and maybe even centuries.

The structure of the Earth

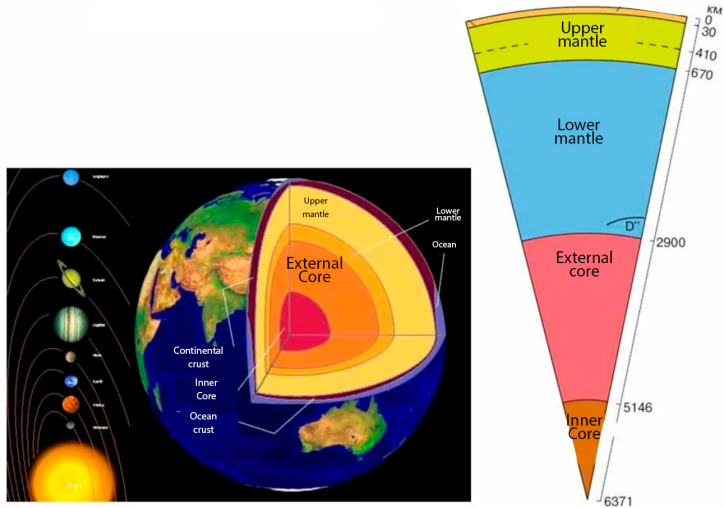


Figure 11. The structure of the earth according to a drawing from the open Internet

An account of the history of the geological evolution of planet Earth in light of the new tectonic hypothesis

The history of the planet's evolution is divided into two stages.

Precambrian stage

The beginning of the Precambrian stage is related to the very bottom of the Lower Archean (4500 million years). At the boundaries of the Early and Late Proterozoic (approximately 1000 million years), the concentric-spherical structure of the Earth (inner and outer core, lower and upper mantle), which had already formed by that time, was covered in a relatively thin shell of the primary earth's crust (Fig. 11) with local areas of the hydrosphere, where the build-up of the primary granite-metamorphic substrate by layered sedimentary rocks of the stratisphere began.

In Russian literature, the geological development of the Earth in the Precambrian, with a detailed and objective description of the stratigraphy, tectonics and

physical conditions on the surface of the planet, is given in the monograph by L.I. Salop [11], and does not require commentary.

Riphean-Phanerozoic stage

One can definitely judge the geological processes of the Earth's evolution in the Riphean-Phanerozoic time by considering only the history of the development of the primary EC. The tool for its cognition has already been "made" by centuries of geological practice - this is a comprehensive analysis of the accumulated array of factual geological and geophysical materials reflected, first of all, in geological maps (the crown of all completed geological studies). But the tool for identifying the causes of the emergence of geodynamic processes that determined the modern structure of the EC and are hidden in the nature of the evolution of the substance of the subcrustal spheres of the Earth has yet to be developed. For now, we have to use only more or less substantiated assumptions.

At this stage of evolution, the geodynamic regimes indicated in the hypotheses of geoundations, geosynclinal and pulsating expansion of the Earth were most active. The first two determined the cellular structure of the primary earth's crust (platforms, belted by folded systems, and thalassocratons, belted by mobile troughs, Fig. 7), the latter - the formation of the newly formed crust and the appearance of global mid-ocean ridges (MOR) and rift systems on the planet.

During this stage, geosynclinal processes consistently developed in separate areas along the periphery of the platforms until they were completely surrounded on all sides.

The processes of pulsating expansion of the Earth, accompanied by the formation of a newly formed earth's crust, occurred discretely in several stages.

In terms of formation time, the most ancient generation of newly formed crust probably dates back to the end of the Riphean. It was probably located in the equatorial regions of the Earth and divided the planet into two supercontinents – Laurasia and Gondwana. Relics of this crust, judging by the characteristic appearance of the morphotype of riftless striped magnetic anomalies, are well preserved in the central part of the Atlantic (Fig. 5) and in several other localized areas of the eastern part of the Alpine-Himalayan fold belt.

The next generation of rift-free newly formed crust is represented by a set of isolated small-sized foci of mantle swelling, localized in the strip of the western edge of the Pacific Ocean, stretching from the Commander Islands to New Zealand (Fig. 4). According to the time of formation, it can presumably be attributed to the Paleozoic (?) - Early Mesozoic.

The next two riftless generations of newly formed crust are located in the central and eastern parts of the Pacific Ocean. In Figure 4 they are designated by the Roman numerals III and IV. The presumed time of their formation can be attributed to the Jurassic-Cretaceous.

The formation of fragmentary World rift systems with mid-ocean ridges apparently spans the end of the Cretaceous and the entire Cenozoic. There are two of them – the Indo-Pacific and the later Indo-Atlantic, designated in Figure 4 by the numbers I and II, respectively.

The above mentioned (paragraphs 1 and 2 of section “*List of new factual data...*») the mechanism of formation of the secondary EC within the fragmented World Rift Systems is clearly illustrated by the results of the analysis of new geological and geophysical materials on the Eurasian Basin in the Arctic Ocean (Fig. 12) using data from [2].

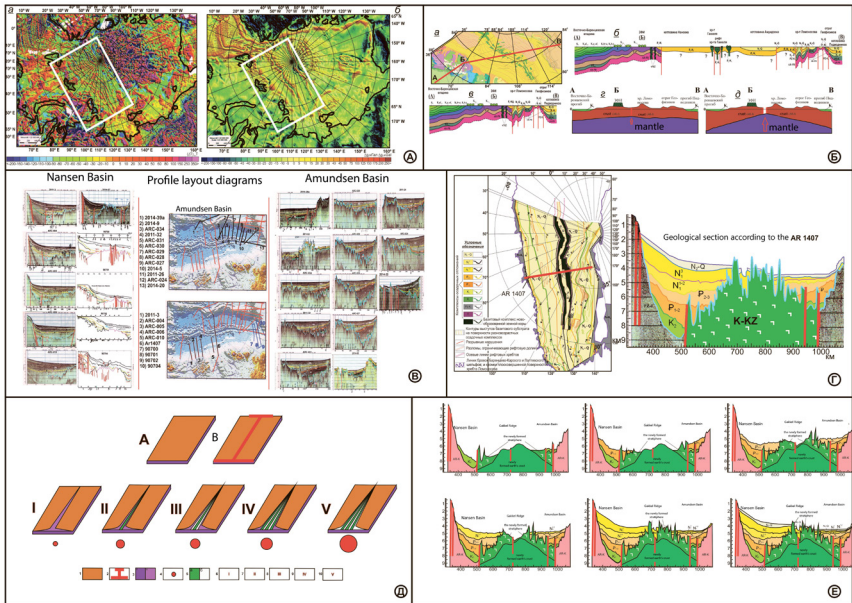


Figure 12. Geophysical study, geological structure and evolution of the Eurasian basin (polar fragment of the Indo-Atlantic rift system in the Arctic Ocean).

(A) – maps of magnetic (a) and gravitational (b) anomalies with location (white contour) The Eurasian Basin;

(B) – excerpt from the Geological map of the Russian Federation m-ba 1:2,500,000 with the line (A-B-C) of the geological section crossing the Eurasian basin (a), the geological section along the line A-B-C (b), the transformants of the geological section A-B-C (c) and (d);

(C) – maps of the seismic (OGT) study of the Eurasian basin and seismic-geological sections in the Nansen and Amundsen basins;

(D) – a geological map of the Eurasian basin, compiled according to seismic profiles (read – geological routes) and the accompanying geological section (red line on the map);

(E) – Schematic diagram of the mechanism (swelling) of the formation of the Earth's crust (the first stage)

1. Primary Precambrian (Archaean - Early Proterozoic) granitic-metamorphic crust (A)

2. Orthogonal fault system that arose at the very beginning of the mantle bulge (B)

3. The mantle exposed as a result of the bloating phase

4. Power (area) of the mantle swelling phase

5. Newly formed (smelting from the mantle) basal earth crust; its magnetization: a) positive (direct) b) negative (reverse)

(6 - 10) Stages of mantle swelling and expansion of torn blocks

6 First stage, 7 Second stage,

8 The third stage, 9 The fourth stage, 10 The fifth (final) stage - a newly formed (basal) crust with a linear band morphotype of an abnormal magnetic field was formed

(E) – The evolution of the second stage of the formation of the newly formed Earth's crust on the example of the Eurasian basin: the build-up of the young basitic crust by a new stratisphere in the process of the conjugate formation of its two facies - volcanogenic (in the mid-oceanic ridge) and sedimentary (in basins adjacent to the ridge). 1. The Archean-Cretaceous substrate of the Barents Sea basin and the Lomonosov basin. 2. Newly formed Cretaceous crust. 3. The new stratosphere: volcanogenic (a) and sedimentary (b) facies

Below, a composite of its individual parts (A, B, C, D, E and G) graphically presents a brief description of the geological structure and evolution of the Eurasian Basin, represented by the polar (SOA) fragment of the Indo-Atlantic rift system.

The area of potential fields of the basin is indicated by a white outline in Fig. 12A, where it is clearly visible that this basin corresponds to the northern polar fragment of the Indo-Atlantic rift system, separated from the adjacent fragment of this system to the south by a rift-free space with continental (judging by magnetic and gravitational anomalies) earth's crust.

The level of exploration (MOV CMP) of the basin is shown on two maps in the center of Fig. 12B. The complexes of seismogeological sections on both sides of these maps reveal a picture of the structure of the sedimentary cover in the Amundsen and Nansen basins, on the basis of which a transparent geological map of the Eurasian basin was constructed, and a geological section is shown.

In Fig. 12 B,a,b, within the framework of the cut from the Geological Map of the Russian Federation on a scale of 1:2 500 000, a geological section is shown along the line Ar 1407 (for its location, see Fig. 12C), crossing the entire Eurasian Basin (line A-B-C), on which it is impossible to read what underlies the Cenozoic in the interval between FJL and the Lomonosov Ridge. The geological section in Figs. 12b and 12c demonstrates that the junction of the left and right parts of this section is easily consistent and read as a large anticline composed of the structures of FJL, the Lomonosov Ridge and the Geofizikov Spur. This anticline divides large sedimentary basins: the Barents Sea shelf basin in the Barents Sea and the Makarov and Podvodnikov basins in the Arctic Ocean. The two parts of Fig. 12, g schematically show the emergence of a fault between the FJL and Lomonosov Ridge blocks and the beginning of their subsequent movement apart.

Fig. 12G on the left shows a transparent geological map of the Eurasian Basin, compiled from seismogeological profiles (side parts of Fig. 12B) and revealing its deep structure hidden under the cover of Cenozoic deposits. To the right of the map is a geological section of the basin along the line of profile Ar 1407.

Fig. 12E illustrates in schematized form the processes of successive swelling of the mantle (swelling), the spreading of broken blocks and the acquisition of a young newly formed EC of a linear-band morphotype in an anomalous magnetic field.

The geological sections (a–e) shown in Fig. 12D reveal a picture of the coupled processes of sedimentogenesis and volcanism in the evolution of the young sedimentary-volcanogenic stratisphere of the Eurasian Basin, consistently building up its newly formed secondary basic ZK, which was formed (see Fig. 12E) from the melts of sections of the upper mantle, exposed as it bulged (the process of swelling) and the split blocks of the primary EC moved apart, acquiring, in the process, a linear-band morphotype of the anomalous magnetic field.

Fig. 12G demonstrates the cellular structure of the EC (newly formed), characteristic of the oceans, specifically in the youngest of them – the Arctic Ocean. In this figure, a stable rigid core with a minimum thickness (about 2 km) of sediments is clearly visible, covering the entire Eurasian Basin and the region of the Central Arctic Rise, and a circum-arch belt of deep troughs enveloping this core, where the thickness of sediments exceeds (in places) 20 km.

Conclusion

In concluding the consideration of such a delicate problem as the replacement of established ideas with new ones, it is impossible not to note some advantages of the proposed hypothesis over the currently dominant plate tectonic concept. They can be characterized by the following provisions:

1. The new “Comprehensive Synergetic Tectonics” is based on the results of a comprehensive analysis of the entire array of factual data accumulated to this day, in contrast to plate tectonics, which relies primarily on speculative assumptions in combination with a specially selected set of facts.

2. It does not reject, as plate tectonics does, but rather involves all the hypotheses and concepts put forward by previous generations of scientists (including plate tectonics), starting with the brilliant guess of A.L. Wegener, his hypothesis of the spreading of continents, put forward a century ago practically out of thin air – after all, at that time there was no information not only about geology, but even about the relief of the ocean floor.

3. Replaces the established ideas about spreading (the expansion of the ocean floor) as the driving mechanism of the evolution of the Earth's crust, built primarily on inferences, with a mechanism of the spreading of continental blocks caused by the swelling of the subcrustal mantle material in the process of the Earth's pulsating expansion, which is substantiated by specific factual data (see the above explanations for composite figure 12).

4. Reveals the geological nature of the linear-band anomalies of the newly formed ("oceanic") EC, caused by the cooling of each "portion" of the mantle, exposed and cooling, in the process of its swelling (swelling) in the corresponding period of inverting polarity of the planet's magnetic field.

5. Provides a rationale for the stage-by-stage formation of potential fields of different ages with linear-strip anomalies

6. Criticizing the Vine-Matthews hypothesis, he allows for its radical revision in cases where there is a need for an approximate chronological dating of magnetochrons.

7. Allows us to set reasoned tasks for further research into the history of the geological development of the Earth's crust, such as, for example, pan-planetary and regional mapping of the deep structure of the Earth's crust in order to identify connections between upper crustal structures and deep heterogeneities, or the development of new fruitful methods for studying physical, chemical, nuclear, and thermodynamic processes in the subcrustal spheres of the planet, which are the cause of all transformations in the structure of the Earth's crust and in the upper subcrustal horizons.

8. Opens the way to the study of problems of planetary orientation:

- identifying the reasons for the presence of terrestrial planets and gas giants in the solar system,

- planning and organizing research into the causes of Mars' loss of its hydro- and atmosphere, based on the assumption that Mars lost them as a result of the explosions of two long-mature giant volcanoes similar to the Yellowstone Crater in North America.

- justification of the assumption about the history of the evolution of the terrestrial planets: Mars is the future of the Earth, Venus is the Precambrian past of our planet, Mercury is the initial stage of the development of the terrestrial planets.

The theoretical substantiation of the new hypothesis and all of its constituent geodynamic processes that participated in the creation of the cellular ZK, as well as the processes that formed the planet itself with its concentric-layered structure (core-mantle-crust, GDR-, atmo-, bio- and noosphere), is the task of further research based on the principles of self-organization (synergetics) of inanimate matter.

These studies must be carried out by a large (within the framework of the convergence of sciences) team of specialists at the intersection of many scientific disciplines: geology, planetology, physics, chemistry, thermodynamics, nuclear physics, astrophysics, other Earth sciences and philosophy.

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LEGAL BASIS OF LAND MANAGEMENT IN THE REPUBLIC OF KAZAKHSTAN

Tazhigulov Almas Amantaevich

*Candidate of Technical Sciences, Professor
Kazakhstan University of Information Technology and Management,
Republic of Kazakhstan*

Amreshev Nurlan Zhangeldievich

*Master of Technical Sciences
Kazakhstan University of Information Technology and Management,
Republic of Kazakhstan*

Seitov Ruslan Mukhtarovich

*Master of Technical Sciences
Karaganda Buketov University, Republic of Kazakhstan*

Tishbekov Arnur Armanuly

*Master of Technical Sciences
Karaganda Buketov University, Republic of Kazakhstan*

Abstract. *The article analyzes the state policy in the field of regulation of land relations in Kazakhstan; the main normative legal acts defining the directions of land policy; land use rights, the procedure for exercising the rights and obligations of land owners and land users, the regulation of land relations in order to ensure the rational use and protection of land,*

Keywords: *state, state power, public administration, legal regulation, land resources, legal foundations, modernization of the legal system.*

Land resources are an integral part of natural resources, which include land, its quality, accessibility and use for various purposes: agriculture, construction, forestry and many others. Effective land management and use are critical for sustainable development and environmental protection.

The legal framework for regulating land resources includes various laws, norms and rules that define the rights and obligations of land owners and users, as well as mechanisms for their protection and management. The main aspects of legal regulation of land resources include:

Land Code: The main document regulating land relations in the country. It defines the types of land, their use, the rights and obligations of owners and users.

Registration of land rights: The process of registration and registration of ownership rights to land plots, which ensures the protection of the rights of owners and the possibility of their legal verification.

Zoning of territories: The establishment of permitted types of land use in different zones (residential, commercial, industrial, etc.), which allows you to plan and organize the use of land.

Environmental protection: Legislation aimed at protecting natural resources, including land, establishes requirements for the protection of land from pollution, erosion and other negative impacts.

Agricultural legislation: Regulates the use of agricultural land, including issues of lease, increasing fertility and protecting the rights of tenants and owners.

State control and inspections: Authorities monitor compliance with land legislation and the lawful use of land resources.

These legal frameworks regulate not only the use of various types of land, but also their protection, which is an important aspect of sustainable development and ensuring the social and economic interests of society.

Currently, in all states, a certain mechanism of public influence on the processes of land use and protection has been formed, corresponding to the political, economic, socio-cultural structure. In Kazakhstan, this mechanism is based on normative legal acts of land legislation, a system of functions of public authority focused on land management and a system of authorized state authorities and local self-government bodies corresponding to these functions.

Kazakhstan is the largest country in Central Asia by territory. Effective and rational exploitation of the country's land potential is the key to sustainable economic development, its competitiveness, as well as improving the well-being of citizens.

According to the Constitution, land and other natural resources are used and protected as the basis of life and activity of the peoples of Kazakhstan. "The earth and its subsoil, waters, flora and fauna, and other natural resources belong to the people. The State exercises the right of ownership on behalf of the people. Land may also be privately owned on the grounds, conditions and within the limits established by law." [1].

Elements of forecasting and planning in land use have become part of the state strategic management of socio-economic development, they should be reflected in regulatory legal acts regulating land relations. However, the Land Code does not mention strategic planning or state strategic management of land use or protection, the need for forecasting and planning in the process management of land resources, on state land policy as the basis of state influence on land relations.

The Land Fund of the Republic of Kazakhstan, in accordance with its intended purpose, is divided into the following categories [2]:

- agricultural land;
- lands of settlements (cities, towns and rural settlements);
- lands of industry, transport, communications, for the needs of space activities, defense, national security, nuclear safety zones and other non-agricultural purposes;
- lands of specially protected natural territories, lands of recreational, recreational, historical and cultural purposes;
- forest fund lands;
- lands of the water fund;

Reserve lands.

The lands are used in accordance with their intended purpose. The legal regime of lands is determined based on their belonging to a particular category and permitted use in accordance with the zoning of lands (territories).

The following zones are distinguished in the territory of the Republic of Kazakhstan according to natural conditions: forest-steppe; steppe; dry steppe; semi-desert; deserted; foothill-desert-steppe; Subtropical desert; subtropical-foothill-desert; Central Asian mountain; South Siberian mountain.

The Land Code defines the competence of the Government of the Republic of Kazakhstan in the field of land relations regulation.:

- development of the main directions of state policy in the field of use and protection of the land fund of the Republic;
- provision and withdrawal of land plots, including for state needs, from lands of all categories in cases related to the creation and expansion of specially protected natural territories of national importance, the fulfillment of international obligations;
- transfer of lands of specially protected natural territories to reserve lands, as well as transfer of reserve lands back to lands of specially protected natural territories on the proposal of the authorized body in the field of specially protected natural territories in accordance with the Law of the Republic of Kazakhstan “On Specially Protected Natural Territories”;
- approval of the procedure for transferring lands from one category to another in cases established by the Law of the Republic of Kazakhstan “On Specially Protected Natural Territories”;
- transfer of reserve lands to the lands of the nuclear safety zone on the proposal of the authorized body in the field of atomic energy use;
- approval of the rules for the transfer of reserve lands to the lands of the nuclear safety zone;
- establishment and change of borders (lines) of cities of republican significance and the capital;

- coordination of proposals of local representative and executive bodies of the region on changing the boundaries of cities of regional significance, as well as the establishment and modification of suburban areas around cities of regional significance;
- determination of the procedure for classifying lands as specially protected natural territories;
- regulation of land relations regarding the provision of lands located on the territory of one (one) region, city of republican significance, capital, for long-term use of another (other) region, city of republican significance, capital.

The competence of the central authorized body includes:

1) generalization of the practice of applying land legislation and its improvement;

2) development and submission for approval to the Government of the Republic of Kazakhstan of draft normative legal acts in the field of regulation of land relations;

- development and approval of regulatory legal acts and regulatory documents, methods for land management, state land cadastre and land monitoring;
- conducting an examination of projects and schemes of national importance affecting the use and protection of land;
- interaction with central and local executive bodies on issues of land relations regulation;
- approval of the passport form for agricultural land plots;
- establishment of the structure, composition, content and forms of land cadastre documentation;
- organization of land monitoring;
- organization of the state land cadastre and compilation of the balance of lands of the Republic of Kazakhstan based on the data of land balances of regions, cities of republican significance, the capital;
- preparation of draft legal acts of the Government of the Republic of Kazakhstan on the provision and withdrawal of land plots, including for state needs, transfer of land plots, including for state needs, from one category to another, within its competence;
- implementation of state control over the use and protection of land;
- coordination of proposals of the local executive body of the region, the city of republican significance, the capital on the provision and withdrawal of land for the needs of defense and national security;
- consideration of cases of administrative offenses in the field of land legislation;

- development and approval of an industry incentive system;
- approval of forms of identification documents for the ownership of a land plot and for the right of land use, except for the form of a cadastral passport of a real estate object;
- approval of the procedure for maintaining the State land cadastre and land monitoring;
- approval of the rules for the provision of land plots occupied by territorial waters for the construction of artificial structures;
- approval of the rules for granting rights to land plots for individual housing construction;
- development and approval of rules for the organization and conduct of auctions for the sale of land plots or the right to lease land plots in electronic form;
- approval of a standard list of government agencies and other organizations to coordinate the scheme of allotment of land.

The Law of the Republic of Kazakhstan regulates public relations on the creation, expansion, protection, restoration, sustainable use and management of specially protected natural territories and objects of the state nature reserve fund, representing special ecological, scientific, historical, cultural and recreational value, as well as being a component of the national, regional and global ecological network [3].

The basic principles in the field of specially protected natural areas are:

- development of a system of specially protected natural territories as a basic component of an ecological network that ensures the conservation and restoration of biological diversity, unique and typical landscapes;
- state regulation, control and supervision in the field of specially protected natural areas;
- preservation of the state nature reserve fund and natural ecological systems;
- the use of specially protected natural areas for the development of science, culture, education, education, tourism;
- responsibility for violation of the legislation of the Republic of Kazakhstan in the field of specially protected natural territories;
- participation of individuals and legal entities in solving problems in the field of specially protected natural areas;
- availability of information in the field of specially protected natural areas;
- international cooperation in the field of specially protected natural areas;
- participation of coordinating councils in solving problems in the field of specially protected natural areas.

The prospects for the development of land policy may depend on many factors, including economic, social, environmental and legal aspects. Here are a few key areas that may become important in the future:

Sustainable land use: The focus will be on sustainable land use practices to preserve ecosystems and prevent soil degradation. This includes agroforestry, organic farming and other environmentally friendly practices.

Digitalization and technology: The use of geographic information systems (GIS), drones and other technologies will help in land management, monitoring the condition of lands and planning their use.

Social justice and access to land: Improving access to land for marginalized groups, including small farms and local communities, will be an important aspect.

Land management in the context of climate change: The need to adapt to climate change will lead to changes in land policy aimed at protecting land from erosion, increasing its fertility and effective management of water resources.

Legislative reforms: It is possible that land legislation reforms will be carried out aimed at simplifying the processes of registration of land rights, protecting the rights of owners and tenants, as well as improving land dispute resolution mechanisms.

Integration of land policy with other spheres: Land policy often intersects with issues of ecology, economics, social policy and municipal management. Creating coherent and integrated strategies will be an important aspect in the future.

Urban land development: Given the growth of the urban population, land policy will also focus on the rational use of urban land, including issues of dense development, green areas and public transport.

These directions may vary depending on a particular country or region, as well as on local economic and social conditions.

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