



SCIENTIFIC RESEARCH OF THE SCO COUNTRIES: SYNERGY AND INTEGRATION

上合组织国家的科学研究：协同和一体化

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

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现代生态系统中的项目管理：本质和主要组成部分
**PROJECT MANAGEMENT IN MODERN ECOSYSTEMS:
THE ESSENCE AND MAIN COMPONENTS**

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注释。本文探讨了在生态系统中应用项目管理的原因，并明确了项目管理系统的主要组成部分，以及项目经理和团队成员在实施阶段的职能。

关键词：项目管理、生态系统、成因、项目、管理职能。

Annotation. *The article identifies the reasons contributing to the use of project management in ecosystems, identifies the main components of the project management system, the functions of the project manager and team members at the implementation stage.*

Keywords: *project management, ecosystem, causes, project, management functions.*

Project management issues play an important role in modern business, as they allow you to effectively plan, organize and control ecosystem projects in order to achieve your goals and deliver results on time and within budget. Therefore, the relevance of the research topic is beyond doubt.

In the modern economy, project management is becoming a special type of activity that allows moving to a new stage of development through progressive ideas or adapting to the market through the introduction of new technologies. [4].

Today, modern ecosystems, which are a set of interrelated elements related to the development, production and distribution of products, strive to improve their position in the market by introducing effective management methods, as well as taking sustainable positions. The level of industry development is inextricably linked to the effectiveness of project management. What do we manage in our project activities? Deadlines, resources, finances, content, changes, personnel, risks, etc. [3].

Project management is increasingly becoming a business substance that permeates all areas of the economic environment. The reasons contributing to the implementation of project management in modern ecosystems are shown in the Figure 1.

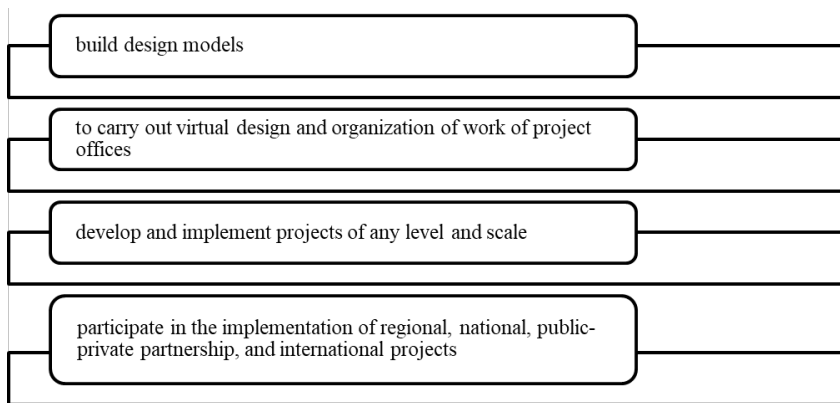


Figure 1. *Reasons contributing to the implementation of project management in modern ecosystems*

The success of any project activity depends not only on the presence of a highly qualified team led by an experienced manager, but also on the choice of tools that will be used in the process of its implementation, as well as proper planning and justification of key indicators of project activity.

Any project in the ecosystem is initiated by the customer, who also approves the basic project plan. The supervisor appoints a project manager and provides the project with resources, as well as supports it. The manager, in turn, develops the basic project plan, plans, monitors and ensures its implementation, leads the project team and is accountable to the customer and the project supervisor. The project team performs all the work on the project according to the basic plan, creating the project product. The result of the project (product) is ultimately received by the customer [5].

The main components of the project management system are interrelated elements such as a competence system, a motivation and incentive system, an information system, and a system of regulatory and methodological support.

The project of any ecosystem is a living organism. Accordingly, it is necessary to monitor the correspondence between the results obtained and the requirements for them, and strive to ensure that the tasks set are solved with proper quality. The compliance tracking process depends primarily on the type of project and the proj-

ect team: reconciliation can take place at a general meeting of the project team, can be performed solely by the project manager, interim acceptance meetings with the customer can be organized, etc. [1].

What management actions are being taken at the project implementation stage ? (Drawing 2).

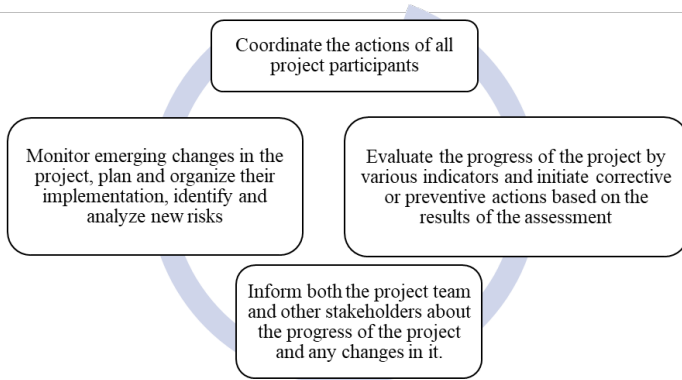


Figure 2. Functions of the project manager at the project implementation stage

Each member of the project team also has a number of functions at the stage of its implementation, shown in the Figure. 3.

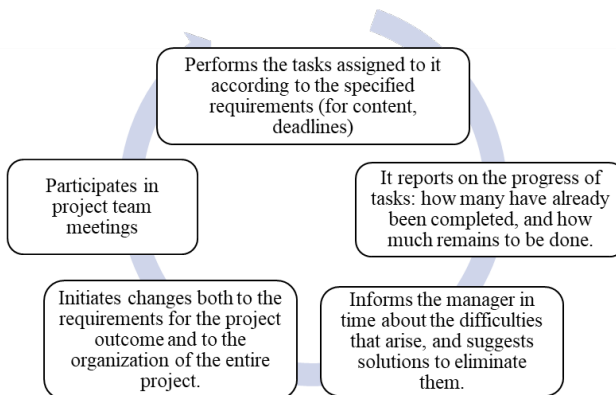


Figure 3. Functions of a project team member at the stage of its implementation

There are situations when the customer or another interested person is in an information vacuum and does not have reliable information about the progress of

the project. This situation will definitely not contribute to the successful achievement of the project's goals, so it is better to initially decide to whom and what information about the progress of the project to provide so that the understanding becomes correct.

Who exactly should understand the status of the project, who should be informed about the progress of the project?

1. Project manager. He is responsible for the entire project, making important decisions about the project. Accordingly, the project manager must have complete information about the progress of the project.

2. The project team. For the successful implementation of a project, it is important that any team member understands what is happening in the project, what tasks they need to perform, and how these tasks can affect the project. Based on this information, the project team will be able to report on emerging difficulties and changes, and propose solutions.

3. The customer and other interested parties. Informing stakeholders at regular intervals helps to keep them involved in the project and manage their expectations, which means that it increases the likelihood of project support and minimizes their resistance. To more accurately identify the recipients, it is convenient to use the matrix of stakeholders, which was discussed in one of the previous lectures. By the way, as the project develops, the composition of stakeholders and the level of their involvement may change, and this should be taken into account [2].

Timely and adequate information about the project directly contributes to success. It is important that an adequate system for informing about the current state of the project, including a system of reporting and control, is built. Such a management system will not only allow for prompt decision-making within the ecosystem, but also reduce the likelihood of conflicts both within the project team and with other stakeholders due to misunderstandings.

Thus, project management can be described as a tool that allows obtaining a specific result aimed at achieving the strategic goals of the ecosystem. It plays a special role in the activities of interacting business entities, making a significant contribution to their joint development.

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管理业务技术以吸引客户参与价值创造过程

MANAGING BUSINESS TECHNOLOGIES FOR ENGAGING CUSTOMERS IN THE VALUE CREATION PROCESS

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摘要: 本文探讨了“共同创造”概念的重要性,该概念假设消费者积极参与产品和服务的形成。本文探讨了有助于消费者参与这一过程的关键商业技术:平台解决方案、用户数据分析、游戏化和个性化人工智能系统。文章特别关注协调这些工具以及根据共同创造原则重组公司内部流程的管理层面。并列举了该模型在国际实践中成功实施的案例。结论是,有效的消费者参与管理可以成为企业可持续竞争优势的源泉和创新发展的驱动力。

关键词: 协作价值创造、数字技术、消费者参与、平台解决方案、创新管理、共同创造。

Abstract. *The article considers the importance of the concept of co-creation, which assumes the active participation of consumers in the formation of products and services. The article discusses key business technologies that contribute to consumer engagement in this process: platform solutions, user data analytics, gamification, and personalized AI systems. Special attention is paid to the managerial aspects of coordinating these tools and restructuring the company's internal processes in accordance with the principles of co-creation. Examples of successful implementation of this model in international practice are given. It is concluded that effective management of consumer engagement can become a source of sustainable competitive advantage and a driver of innovative development of the company.*

Keywords: *collaborative value creation, digital technologies, consumer engagement, platform solutions, innovation management, co-creation.*

Introduction

The current stage of economic development is characterized not only by the rapid introduction of digital technologies, but also by a profound transformation of the consumer's role in the process of creating products and services. The traditional model, in which the company is the sole source of value and the consumer is its passive recipient, is gradually giving way to a more dynamic and interactive system of interaction. Within this new paradigm, the consumer becomes a full participant in the value generation process, taking part in the design, adaptation, and even product promotion.

The concept of co-creation of value, developed at the beginning of the 21st century, reflects this shift. According to her, value does not arise within the company, but as a result of the interaction between the business and the consumer. This interaction can take various forms, from providing feedback and participating in user testing to actively participating in the development of new features, products, or services. Consumer engagement is becoming not only a source of innovation, but also a factor in increasing loyalty, trust, and the quality of user experience.

Business technologies, a set of digital tools, organizational practices, and platforms aimed at creating an infrastructure for user interaction, play a key role in ensuring such engagement. These technologies allow companies to build more flexible and adaptive business models in which the customer is not just served, but becomes a co-author of the product being created.

The relevance of this topic is determined by a number of factors. Firstly, increased competition requires companies to continuously improve their product policies and focus on the real needs of the user. Secondly, the digital environment provides ample opportunities for scalable and effective interaction with the audience. Thirdly, empirical evidence indicates an increase in the efficiency and profitability of companies implementing co-creation strategies in their operations [1].

The purpose of this article is to analyze the management mechanisms of business technologies aimed at involving consumers in the value creation process. The research examines the theoretical foundations of the concept of shared value creation, technological solutions that ensure its implementation, as well as management approaches to integrating these practices into the company's business processes.

1. The theoretical foundations of consumer engagement in value creation

The concept of co-creation of value has become widespread in marketing theory thanks to the work of Prahalad and Ramaswamy. According to this concept, value does not arise within the company, but in the process of interaction with the consumer. Thus, the consumer becomes a full participant in the production process at the stage of design, testing, adaptation and product promotion.

The difference between co-creation and the traditional approach is that the value created becomes the result of a dialogue between the company and the con-

sumer. Engagement can be either direct (through participation in product development) or indirect (through feedback, user content, behavioral data).

For decades, the concept of value in economic and managerial theory has been considered primarily within the framework of a production-oriented paradigm in which the company was the main source of value, and the consumer was its final recipient. However, in the late XX — early XXI century, against the background of increased market competition, the growing importance of customer experience and the spread of digital technologies, there was a transition to a new logic of value creation focused on interaction and cooperation.

Unlike the classical approach based on a producer-centered model, the co-creative model focuses on consumer experience and individual perception. This model assumes the decentralization of sources of innovation and the recognition of the importance of the subjective consumer experience as the main component of the created value. This is especially true in areas where value is determined not only by the functionality of the product, but also by its compliance with individual needs, the context of consumption and involvement in the creation process [3].

In the framework of service-oriented logic, value is considered as arising from the sharing of resources and knowledge exchange between the supplier and the customer. This logic emphasizes that value is not transferred from the company to the consumer, but is formed as a result of joint efforts. In this context, the consumer becomes not only a participant, but also an active initiator of innovation, influencing the strategic development of the company.

From the point of view of behavioral economics, consumer involvement in the value creation process can be considered as a factor in increasing satisfaction and loyalty due to the effect of psychological involvement and perception of the product as a result of one's own activities. Participation in the creation of a product — through customization, feedback, or user initiatives — contributes to the growth of the subjective significance of the result [2].

2. Engagement technologies and their management potential

There are many prerequisites for involving consumers in the value chain, including increased competition, oversaturation of markets, increased consumer demands for variety and quality of goods, individualization of demand, and acceleration of product obsolescence. However, two more important factors should be noted. One of them is the progress in the field of information and communication technologies, which creates opportunities for using an interactive virtual environment for interaction between enterprises and consumers when improving or creating new products.

The last of these forms of prosumerism is of particular importance in innovation activities. When organizing the innovation process based on consumer engagement, manufacturers of goods acquire the following opportunities: under-

standing the strengths and weaknesses of a product or project; attracting fresh ideas and suggestions from outside; gaining access to additional inexpensive intellectual resources (consumer knowledge and labor); generating alternative ideas from which to choose the best; forming a base of active users, who are interested in creating a new product and can subsequently participate in its promotion; reducing the uncertainty associated with the sale of goods due to a better understanding of the market, and sometimes due to the creation of a circle of potential customers among those involved in the development of these products (which is relevant for the B2B sector).

According to various studies, modern consumers are characterized by: less and less trust in advertising of goods and services; information awareness regarding the characteristics of goods and the appearance of new products on the consumer market; independence in forming attitudes towards manufacturing companies and in evaluating their products; willingness to participate to varying degrees in communities of interest and in discussions with other consumers of goods and services and the problems of their use; the relative willingness to offer ideas for improving products, to participate in the development of new or improved existing products [4].

In the context of digital transformation, the key tools of engagement are:

- **Platform solutions (for example, marketplace, crowdsourcing platforms, user communities) that provide the technical infrastructure for interaction;**
- **Data analytics tools to identify user preferences and predictively adapt offers;**
- **Feedback interfaces, including reviews, voting, and customized questionnaires;**
- **Gamification technologies that encourage participation through game mechanisms;**
- **AI personalization systems that shape the user's individual path and increase engagement through relevant content.**

Managing these technologies requires coordination between IT departments, marketing, product development, and analytics. There is a need for a new role — the digital interaction manager, whose task is to ensure end-to-end integration of the user experience [5].

One of the central groups of technologies is platform solutions focused on creating a digital environment for user interaction. These include crowdsourcing platforms, user communities (community-based platforms), marketplaces with customization elements, as well as customer personalization systems. These solutions allow companies to organize the collection of ideas, conduct voting, involve users in prototype testing and exchange experiences between consumers. The plat-

form provides scalability, modularity, and the ability to integrate with other digital management tools.

Equally important elements of the technological landscape are systems for collecting and analyzing user data, including behavioral analytics, audience segmentation, feedback monitoring, and predictive preference models. Modern tools based on artificial intelligence and machine learning make it possible not only to capture the user's current needs, but also to predict changes in their behavior, which makes it possible to proactively interact and coordinate joint actions in real time [6].

Gamification mechanisms have also proven to be effective in stimulating user activity. The use of game elements (rewards, levels, challenges) increases motivation to participate in digital interaction, especially among young and digitally literate audiences. Such mechanisms are successfully used both in the B2C segment (for example, in mobile applications and loyalty programs) and in the corporate environment (when conducting crowdsourcing sessions within organizations).

From a managerial point of view, the introduction of these technologies requires not only technical implementation, but also organizational adaptation. There is a need to form cross-functional teams combining competencies in IT, marketing, UX design and product management. Managing user engagement is becoming a cross-functional task that requires flexible methodologies (Agile, Lean Startup), constant hypothesis testing, and feedback-based adaptation.

In addition, the risks associated with managing user expectations, data privacy, and maintaining a balance between the consumer's initiative and the company's strategic goals should be considered. Engagement cannot be an end in itself: it must be embedded in the logical structure of the company's product and communication strategy [7].

3. Management of cooperation processes

Involving consumers in value creation involves restructuring business processes.:

- Decentralization of innovation: the generation of ideas is transferred outside the company to the user community.
- Iterative approach to development: the product adapts based on user engagement, feedback, and A/B testing.
- Customer-oriented process architecture: processes are optimized for the convenience and motivation of the consumer to participate.

A key success factor is a transparent expectations management system: the consumer must understand how his contribution affects the final product. Without this, motivation to participate may decrease. Managing co-creative processes requires a revision of the standard logic of product development. Instead of centralized planning, a decentralized approach is used: ideas and feedback come from users through the community, platforms, or directly in the product.

Product teams work iteratively: hypothesis — test — feedback — refinement. This is impossible without an established communication cycle with users and a quick response to their suggestions. Agile and Lean approaches make it possible to integrate co-creation into daily work [8].

It is important to simplify participation: a clear interface, transparent rules, and minimal barriers. If the user doesn't understand why they need it and what the result will be, they simply won't participate. Therefore, the managerial task is not only to collect ideas, but also to recognize the contribution: to show that the proposals were taken into account, and to explain why some were not. New roles are being created for a sustainable process: product facilitators, community managers, and user insights analysts. They connect users with internal teams and make sure that ideas don't get lost.

Co-creation only works if it is embedded in the product strategy and supported by a culture of openness. Without it, it becomes a formality.

4. Examples of successful implementation

Companies that have succeeded in building co-creation systems show a number of common features:

1. Yandex

Yandex services (including Yandex.Music, Yandex.Market, and Yandex Browser) They regularly collect user feature requests and arrange open testing of new features. For example, the “Experiments” section in Yandex Browser allows you to enable experimental functions, and user behavior in these modes is used as a source of feedback.

2. Ozon

The marketplace runs surveys inside the app and collects feedback on the quality of delivery, packaging, and product cards. This data not only influences changes in the interface, but is also used to develop platform tools for sellers. In addition, Ozon encourages the creation of user-generated content - reviews, photos, videos — that directly affect the perception of the product by other customers.

3. Avito

Avito applies co-creation approaches in the development of functionality for businesses and individuals. For example, when introducing paid options, the company tests them on a limited audience, collects feedback and adapts the value of the offer to a large-scale release. Users also regularly participate in in-depth interviews and UX tests, which are used to make changes to the interface.

4. Vkusvill

Previously, VkusVill used an open feedback model: customers could leave feedback through a mobile app or website, and the team responded promptly to comments. Some products, packages, and formulations have been modified or removed from the product range at the initiative of customers. The company also

tested products on limited groups of customers before launching a wide sale. Эти примеры демонстрируют, что управление вовлечением потребителей — это не только вопрос технологий, но и организационной культуры, готовности делиться контролем и быть открытым к изменениям.

These examples demonstrate that managing customer engagement is not only a matter of technology, but also of organizational culture, willingness to share control, and openness to change.

Conclusion

The transition from the traditional model of unilateral value creation to the model of joint consumer participation represents a fundamental change in the logic of business management. Modern technologies offer great opportunities for integrating customers into the processes of designing, developing, testing and improving products and services. However, technological solutions alone do not ensure efficiency. The key is to manage these solutions competently, including strategic planning, organizational restructuring, and building a long—term dialogue with consumers.

Managing business engagement technologies requires cross-functional interaction between IT, marketing, analytics, and product management. It is necessary to transform internal processes towards greater flexibility, transparency and customer-centricity. In addition, it is important to take into account not only the technological, but also the cultural component: the company's willingness to be open, to recognize external contributions and to abandon the monopoly on innovation.

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俄罗斯引入国际标准：会计和税务

INTRODUCTION OF INTERNATIONAL STANDARDS IN RUSSIA: ACCOUNTING AND TAXATION

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注释。本文探讨了与国际财务报告准则（IFRS）过渡相关的会计和税务会计、会计（财务）报表编制以及税务方面的新规则。2025年，国内会计实践将继续引入创新：基于国际财务报告准则（IFRS）制定的新财务会计准则（FSBU）。随着新财务会计准则的实施，个人所得税的累进税率以及标准财产扣除也进行了创新。因此，妥善组织的会计和税务以及及时足额缴纳税费是国家经济安全的必要组成部分。大型俄罗斯公司的会计和报告系统正变得更加清晰，更易于外国商业伙伴使用。新准则的逐步实施使内部会计能够符合国际惯例，并满足全球经济的现代要求。

关键词：准则、个人所得税准则（PBU）、财务会计准则（FSBU）、国际财务报告准则（IFRS）、会计、税率、税收、库存、累进税率、扣除、报告、审计师。

Annotation. *The article discusses new rules for accounting and tax accounting, preparation of accounting (financial) statements, taxation in connection with the transition to IFRS. In 2025, innovations continue to be introduced into the practice of domestic accounting: new FSBU developed on the basis of IFRS. In connection with the adoption of new FSBU, innovations are introduced to the progressive scale of personal income tax, as well as standard, property deductions. As a result, properly organized accounting and taxation and timely and full payment of taxes and fees are a necessary component of the country's economic security. Accounting and reporting for large Russian companies are becoming clearer and easier to use for foreign business partners. The process of gradual implementation of new standards allows internal accounting to comply with international practice and meet the modern requirements of the global economy.*

Keywords: *standards, PBU, FSBU, IFRS, accounting, rates, taxes, inventory, progressive scale, deductions, reporting, auditor.*

As part of the adaptation of Russian legislation to international standards, accounting standards are being continuously and gradually updated.

All companies operating in Russia, including small businesses, are required by law to maintain accounting records and submit financial statements to tax authorities. For individual entrepreneurs registered as individuals, the preparation of financial statements is not mandatory (according to Federal Law No. 402) [1].

In 2025, significant changes continue in the accounting sphere: new Federal Accounting Standards (FAS), developed on the basis of International Financial Reporting Standards (IFRS), come into force. In connection with the implementation of the new FAS, previously valid accounting regulations (PBU) lose their force.

In 2025, eight Federal Accounting Standards (FAS) that are already in use in practice will be mandatory for accountants:

- FSBU 5/2019 “Inventories”, regulating the accounting of inventories.
- FSBU 26/2020 “Capital Investments”, which determines the procedure for accounting for capital investments.
- FSBU 6/2020 “Fixed Assets”, which establishes the rules for accounting for fixed assets.
- FSBU 27/2021 “Documents and document flow in accounting”, dedicated to documents and document flow in accounting.
- FSBU 25/2018 “Accounting for Leases”, regulating the accounting of lease transactions.
- FSBU 14/2022 “Intangible Assets”, which defines the accounting of intangible assets.
- FSBU 4/2023 “Accounting (financial) statements”, which establishes requirements for accounting (financial) statements.
- FSBU 28/2023 “Inventory”, regulating the conduct of inventory.

The article examines innovations in accounting and taxation in connection with the transition to international standards.

Research results. The process of adapting Russian laws to international standards includes a gradual and continuous update of accounting standards. This process is part of the coordination with IFRS. On January 1, 2025, two new rules were introduced simultaneously: FSBU 4/2023, which regulates the preparation of financial statements, and FSBU 28/2023, which sets out guidelines for conducting an inventory of accounting objects.

Accounting and reporting for large Russian companies are becoming clearer and easier to use for foreign business partners. The process of gradual implementation of new standards allows internal accounting to comply with international practice and meet the modern requirements of the global economy.

FSBU 4/2023 “Accounting (financial) statements”. FSBU 4/2023, introduced by Order of the Ministry of Finance dated 04.10.2023 No. 157n, replaced two regulatory documents:

- PBU 4/99 “Accounting statements of an organization”, approved by order of the Ministry of Finance dated 06.07.1999 No. 43n;
- Order of the Ministry of Finance dated 02.07.2010 No. 66n “On the forms of financial statements of organizations”.

FSBU 28/2023 “Inventory». The new FSBU 4/2023 is mandatory for use starting with reporting for 2025.

All organizations must prepare reports according to the rules of the new FSBU, except:

- budgetary institutions;
- Central Bank of the Russian Federation;
- who prepares consolidated (financial) statements or statements not for the purposes of Federal Law No. 402-FZ “On Accounting” dated 06.12.2011 [1].

Individual entrepreneurs, as before, may not fill out financial statements, since they are not required to keep accounting records.

The main requirements for financial statements:

- accounting (financial) statements must be in Russian, and the indicators in them must be in rubles only;
- the report must be submitted in electronic form with the mandatory EDS (electronic digital signature) of the head and chief accountant of the organization.

One of the main requirements remains to ensure the reliability of accounting (financial) reporting. In this regard, two important aspects are highlighted:

1 All data must be correctly reflected in accordance with applicable rules and laws.

2 The accounting (financial) statements indicate only the essential indicators that are truly important.

The “Code” column in the accounting reporting forms must be filled in when sending documents to the Federal Tax Service, statistics authorities, or other government agencies. It is located next to the “Indicator Name” column and is used to indicate the corresponding codes of accounting indicators.

In the heading of each form of accounting (financial) statements, it is mandatory to fill in additional information, including data on the mandatory audit check (clauses 58 and 59 of FSBU 4/2023).

Under the new rules, interim reporting looks the same as annual reporting. For example, commercial organizations will only provide a balance sheet and a report on financial results, and non-profit organizations will provide a balance sheet and a report on the use of targeted funds.

The reporting forms have changed: the balance sheet now includes the lines “Investment Property” and “Long-Term Assets for Sale”, and the line “Income of Future Periods” has been removed. The OFR now separately shows the financial result from activities that the company has ceased.

FSBU 28/2023 “Inventory”. The new FSBU standard 28/2023 “Inventory” is valid for all legal entities from April 1, 2025. It is recommended to attach approved forms of documents to the accounting policy of the organization, which will be used during inventories.

The main objective of the new inventory standard is to improve the accuracy and quality of accounting and financial reporting.

The main changes introduced by the new FSBU 28/2023 “Inventory”, in comparison with the current procedure:

- the inventory can be performed by an auditor. In this case, there is no need to form an inventory commission;
- a commission consisting of more than five people has the right to conduct an inventory in the absence of one of them. If the commission has more than 10 people, the absence of two members is allowed;
- photo or video materials can serve as evidence of the presence of the object. This is relevant in cases where its inspection is impossible or too expensive;
- surpluses may be assessed in one of three ways: at fair value, at book value, or at book value [4].

VAT. Organizations and individual entrepreneurs (IE) — sellers of goods subject to traceability, in most cases must issue invoices in electronic form. This rule also applies to the transfer of traceable goods as part of completed work. The seller must also issue invoices in situations where the buyer is not a VAT payer or is exempt from taxpayer obligations (subparagraph 1 of paragraph 3 of Article 169 of the Tax Code of the Russian Federation).

The invoice for traceable goods must indicate traceability details in accordance with paragraphs 16–19 of paragraph 5 of Article 169 of the Tax Code of the Russian Federation.

Personal income tax. From January 1, 2025, the progressive scale of personal income tax has changed. Increased rates are applied from income over 2.4 million rubles.

For income from the sale of property and transactions with securities, dividends, insurance payments, interest on deposits, there are two rates - 13 and 15% (clause 39, article 2 of Federal Law No. 176-FZ of 12.07.2024).

We summarize the changed deductions for personal income tax in Table 1.

Table 1

Types of personal income tax deductions in 2025

Types of personal income tax deductions	Personal Income Tax Benefits
Standard	<p>Since 2025, the amounts of child deductions have been increased. They will be provided in each month of the year until the month in which income exceeds 450 thousand rubles, in the following amounts:</p> <ul style="list-style-type: none"> - 1,400 rubles for the first child; - RUB 2,800 for the second child; - 6,000 rubles for the third and each subsequent child; - 12,000 rubles (for a parent, spouse of a parent and adoptive parents, guardian, trustee, foster parent and their spouses) - for each disabled child under 18 years of age and full-time students, postgraduate students, residents, interns and students under 24 years of age, if they are disabled persons of group I or II. <p>All children must be counted, even if the deduction is no longer provided for older children.</p>
Social	<ul style="list-style-type: none"> - for charity (no more than 25% of income); - for children's education (no more than 110 thousand rubles per child); - for personal education in total with treatment, purchase of medicines, voluntary pension insurance (no more than 150 thousand rubles)
Property	<ul style="list-style-type: none"> - when selling real estate (no more than 1 million rubles) and other property (no more than 250 thousand rubles) owned for less than 3 years; - for new construction or acquisition of real estate (up to 2 million rubles + 3 million rubles interest on loans)

In 2025, a deduction of 18,000 rubles per year was also introduced for those who passed the GTO standards and underwent a medical examination. According to the changes to the Tax Code of the Russian Federation, this deduction applies to persons who have fulfilled the standards of the All-Russian physical education and sports complex "Ready for Labor and Defense" corresponding to their age group, awarded a badge of distinction, provided that the taxpayer undergoes a medical examination in the relevant calendar year.

Example. In 2025, an employee of Ural LLC underwent a medical examination, received medical clearance to pass the GTO standards and met these standards. In July of the same year, he was awarded the gold GTO badge of distinction, and already in August, he presented his employer with a certificate of passing the medical examination and a copy of the certificate of the person who completed the GTO [3].

The employee's salary is 120,000 rubles per month. When paying the salary for the second half of August, the personal income tax to be paid is calculated as follows: $(60,000 \text{ rubles} - 18,000 \text{ rubles}) \times 13\% = 5,460 \text{ rubles}$.

For the purchase of housing, the maximum amount of expenses from which the deduction will be calculated is 2 million rubles.

For a mortgage, the maximum amount of expenses is 3 million rubles. The deduction for paying interest on a mortgage is returned once for only one property.

In 2025, for citizens whose tax rate has changed, the maximum amounts will increase:

- for the purchase of housing: at a personal income tax rate of 15% - 300 thousand rubles, 18% - 360 thousand rubles, 20% - 400 thousand rubles, 22% - 440 thousand rubles;

- for mortgage interest: at a personal income tax rate of 15% - 450 thousand rubles, 18% - 540 thousand rubles, 20% - 600 thousand rubles, 22% - 660 thousand rubles.

The largest amounts can be received by those who pay a tax at a rate of 22% - for this, the annual income must exceed 50 million rubles per year. Then, for the purchase of housing, you can return 440,000 rubles, and for mortgage interest - 660,000 rubles [3].

Insurance premiums. From January 1, 2025, another reduced tariff is in effect - 7.6% of payments in excess of the minimum wage per month for SMEs (small and medium-sized businesses). But this is only for those SMEs whose main activity is included in the OKVED in the “Manufacturing industries” section. Currently, the reduced tariff is 15% of payments in excess of the minimum wage for all SMEs. From January 1, 2025, the minimum wage (minimum wage) in Russia is 22,440 rubles per month, and in the Republic of Bashkortostan - 25,806 rubles (before deducting personal income tax).

An SME entity applies the above-mentioned reduced rates of insurance premiums from the 1st day of the month in which information about it is entered into the unified register of SME entities, and until the 1st day of the month in which it is excluded from the unified register of SME entities.

Income tax. The tax rate has been increased to 25%, and for IT companies to 5% (clause 50, article 2 of Law No. 176-FZ). The changes will take effect from January 1, 2025 [2].

In the context of the increase in the basic rate of income tax, it becomes clear that organizations on the OSNO will try to close contracts with their customers and clients in 2024 in order to show sales in the current year. This will allow for income tax savings of as much as 5 percentage points.

Example. A construction company carries out a single order for repair and construction work during 2024. Since it is the only one, all expenses are direct and accumulate as WIP. As of the end of December 2024, 13,000,000 rubles have accumulated as WIP. Revenue equal to 18 million rubles will be reflected in income at the time of signing the act with the customer.

If this happens in 2024, the profit tax will be: $(18 \text{ million} - 13 \text{ million}) \times 20\% = 1 \text{ million rubles}$.

If in 2025, the profit tax will be: $(18 \text{ million} - 13 \text{ million}) \times 25\% = 1 \text{ million} 25 \text{ thousand rubles}$.

Changes in the simplified tax system. Starting from January 1, 2025, the thresholds for transition and application of the simplified tax system have become higher. According to the new rules, you can transition to the simplified tax system if:

- income for the first 9 months of last year will not exceed 337.5 million rubles;
- average number of employees - 130 people;
- residual value of fixed assets - 200 million rubles.

The maximum income for the simplified tax system has been increased to 450 million rubles; no higher rates are provided.

Current figures: income for the year - no more than 265.8 million rubles ($200 \text{ million rubles} \times 1.329$). For income from 199.35 to 265.8 million rubles, taxes must be paid at higher rates.

As a result, a greater number of organizations and individual entrepreneurs will be able to use the simplified tax system, which is a positive point.

Since 2025, simplified taxpayers have become VAT payers, but with income up to 60 million rubles, they will be exempt from this tax. With income from 60 to 250 million rubles, it is possible to pay VAT at a rate of 5%, and over 250 million rubles - 7%, but input VAT deductions cannot be applied at such rates.

Here we immediately see a problem for those simplified taxpayers who plan to pay VAT at rates of 5 and 7%. Buyers of their goods, works, services will be able to deduct VAT at these reduced rates, which is not profitable for them. Therefore, organizations and individual entrepreneurs on the simplified tax system, in order not to lose clients, are better off paying VAT at regular rates.

Another problem is that the obligation to pay VAT will in any case affect the price of goods, works and services. Therefore, for retailers, rates of 5 and 7% are more suitable. After all, their customers will not accept VAT as a deduction.

Property tax. From January 1, 2025, for real estate with a cadastral value of over 300 million rubles, the subjects of the Russian Federation will be able to set a tax rate of up to 2.5%. But it is not a fact that they will use this right immediately.

Conclusion. The main trend towards increasing taxes is obvious. But if in the personal income tax the growth of the tax burden is directly dependent on the income of citizens, then in the profit tax the basic rate will increase for all organizations [6]. Nevertheless, the main principle of the domestic tax system has been preserved - the majority of taxes to the budget system are paid not by citizens, but by businesses. As experience shows, there will always be dissatisfied people, since taxation is based on a certain conflict of interests between the state and individuals.

At the same time, there is a growing understanding in society that timely and full payment of taxes is a necessary component of the country's economic security.

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区域经济结构变化对白俄罗斯共和国铁路运输运营的影响

**THE IMPACT OF STRUCTURAL CHANGES IN THE REGIONAL
ECONOMY ON THE OPERATION OF RAILWAY TRANSPORT IN
THE REPUBLIC OF BELARUS**

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摘要: 本文探讨了经济结构变化对铁路运输运营的影响。分析了主要宏观经济指标对铁路货运效率的影响方向和特征,并指出铁路运营商和政府机构需要共同制定未来发展规划。

关键词: 铁路运输, 运输量, 结构变化, 宏观经济指标, 影响程度。

Abstract. *The article examines the impact of structural changes in the economy on the operation of rail transport. The direction and features of the impact of key macroeconomic indicators on the effectiveness of rail freight transportation are established. The need for joint development of a plan for further development by the rail carrier and government agencies is reflected.*

Keywords: *railway transport, traffic volume, structural changes, macroeconomic indicators, degree of influence.*

Introduction.

At the present stage, the development directions of the world market of freight rail transportation are largely determined by internal and external transformations occurring as a result of significant changes in economic and geopolitical conditions. Under the influence of Western sanctions and counter-sanctions, the usual rhythm of foreign economic activity has completely changed, resulting in a rupture of a number of logistics chains between producers of goods/raw materials and buyers. The destruction of supply chains that had been developed over the years has directly affected the organization of rail transportation. In this context, it is very important to establish the direction and features of the influence of structural changes in the regional economy on the operation of rail transport.

The functioning of the freight rail transportation market in the Republic of Belarus has been characterized by significant fluctuations in the last decade. After

a significant drop in transportation volumes in 2020 as a result of the impact of uncontrollable external factors (the spread of coronavirus infection), in the subsequent period, the change in the resulting indicators was characterized by a drop in 2022-2023 and a gradual recovery in 2024. At the same time, it can be clearly concluded that the observed structural changes caused by changes in economic and geopolitical conditions had an impact on the transportation market.

The impact of structural changes was actually realized through a decline in the volume of production and sales of products of national producers, as well as a significant reduction in the volume of foreign trade in goods. In the context of freight rail transportation, such an impact led to:

- changes in key cargo flows, the emergence of significant restrictions in the geography of deliveries, as well as in the volume of transportation;
- changing the nomenclature structure of cargo flows, transporting low-margin cargoes instead of high-margin ones (coal, timber, oil cakes, oil products, agricultural machinery, industrial raw materials, peat, ferrous metals);
- the emergence of restrictions on the types and forms of payment acceptance, as well as the impossibility of receiving payment for services rendered from companies resident in certain countries;
- the emergence of significant uncontrollable factors affecting the area of customs clearance and the passage of trains through the territory of other countries, and causing a significant increase in the delivery time of goods.

The fact that restrictions in the development of rail freight transport are due to the influence of structural changes and the reduction in production volumes and foreign trade can be seen from a visual examination of their trends in 2015-2024 (Figure).

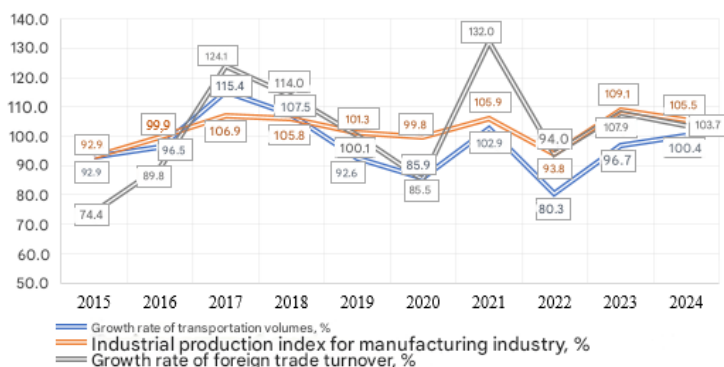


Figure. Change in the volume of transportation and key macroeconomic indicators in the Republic of Belarus in 2015–2024 [1,2]

The analysis of the dynamics of the presented indicators allows us to clearly establish their unidirectional change: when macroeconomic indicators decrease, the indicators of the railway transport operation also decrease. To verify the noted conclusion was a correlation and regression study was conducted based on data on the dynamics of the volume of freight transportation by rail and changes in key macroeconomic indicators.

Initially, using correlation analysis (a quantitative method for determining the closeness and direction of the relationship between sample variables), the degree of influence of industrial production volumes and foreign trade turnover on the volume of transportation was determined. The analysis showed that both industrial production volume and foreign trade turnover volume have a significant impact on volume of freight transportation by rail (the correlation level was 0.720 and 0.713, respectively).

To assess the strength of the relationship, the English statistic Chaddock scale was used, within which the following significance intervals were established: weak relationship-from 0.1 to 0.3, moderate relationship-from 0.3 to 0.5, significant correlation-from 0.5 to 0.7, high correlation-from 0.7 to 0.9, very high (strong) correlation-from 0.9 to 1.0. The correlation level for both parameters is within the limits, reflecting a high relationship, while a direct relationship is observed between the dependent variable and the studied independent indicators.

In order to more accurately determine the magnitude of the influence of industrial production volumes and foreign trade turnover on the volume of freight rail transportation, two additional regression models were constructed, within the framework of each model one dependent and one independent variable were adopted:

- model of dependence of the volume of transportation and the index of industrial production in the manufacturing industry (model 1: $V_{\text{transportation}} = 1.322 V_{\text{industrial production}} - 1.848$);
- model of dependence of the volume of transportation and the volume of external trade turnover (model 2: $V_{\text{transportation}} = 0.410 V_{\text{turnover}} + 55.087$);

The values of the coefficients of determination for the regression models were 0.518 and 0.509, respectively, which indicates that the change in the volume of freight rail transportation is due to a change in the volume of industrial production by 51.8% and a change in the volume of foreign trade turnover by 50.9%. The nature of the connection established for both models is direct, i.e.: with an increase in the volume of industrial production and foreign trade turnover, an increase in the volume of transportation will be observed.

The statistical significance of the coefficients of the variables of the constructed models was determined using t-Student's t-statistics taking into account the established significance level of 5%. Based on the comparison of the calculated and

critical values, it can be established that the variables $V_{ind. prod.}$ and V_{trade} turnover in the equations are statistically significant and the coefficients for them are significant (the p-value for $V_{ind. prod.}$ was 0.019, for V_{trade} turnover - 0.021). The statistical significance of the equations as a whole is also confirmed: the calculated values of Fisher's statistics for the equations exceed the critical ones (the significance of F for model 1 was 0.019, for model 2 - 0.021).

Obtained dependencies allow us to clearly establish the presence of a direct relationship between the indicators under study and determine the high importance of implementing an effective foreign economic policy to ensure sustainable growth in the volume of rail transportation.

Conclusion.

Thus, the current stage of development of railway transport in the Republic of Belarus is characterized by the recovery of transportation volumes after the observed decline in 2022-2023, caused by significant structural changes in the economy. The impact of structural changes was actually carried out through a decline in production volumes and sales of products of national producers, as well as a significant reduction in the volume of foreign trade in goods, which occurred due to changes in economic and geopolitical conditions.

In order to restore the volume of transportation, national railway carriers carry out extensive work aimed at increasing the volume of loading, developing new services and options for cooperation with clients, and building optimal train routes. However, along with internal measures, the foreign economic and foreign trade policy pursued by the government and national manufacturers plays a significant role in improving the performance of railway transport due to the direct and significant impact of industrial production and foreign trade in goods on the volume of transportation. In this context, the joint development of a plan for further development by the railway carrier and government agencies (taking into account the already established external relations with friendly countries and potential points of interaction) is very significant.

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企业的人才潜力及其提升的主要方向——以俄罗斯联邦财政部“GU AZ”联邦预算机构为例

**THE PERSONNEL POTENTIAL OF THE ENTERPRISE AND
THE MAIN DIRECTIONS OF ITS IMPROVEMENT USING THE
EXAMPLE OF THE FEDERAL BUDGET INSTITUTION “GU AZ OF
THE MINISTRY OF FINANCE OF THE RUSSIAN FEDERATION**

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注释。本文致力于探讨企业人力资源潜力的形成与开发问题。在当今俄罗斯人口问题和经济形势的背景下，提升组织人力资源潜力至关重要。许多人事管理领域的科学家和专家致力于研究人力资源潜力的分析方法。然而，考虑到联邦制国家组织的具体特点，人力资源开发管理方法尚未在现代人事管理理论体系中得到充分体现。在“人才潜力”概念的框架下，以企业为例，探讨了人才潜力的一般发展方向和具体发展方向。俄罗斯联邦财政部国家航空管理局作为联邦国家机构，制定了开发人力资源潜力的标准方法和创新方法。

关键词：人力资源潜力、人力资源潜力的开发与提升、人力资源潜力分析、人力资源潜力在企业管理体系中的作用。

Annotation. *The article is devoted to the issues of formation and development of human resources potential at the enterprise. Today, improvement of human resources potential in organizations is of great importance, especially in the context of existing demographic problems and the economic situation in Russia. Many scientists and specialists in the field of personnel management have devoted their works to the study of methods of analysis of human resources potential. However, methodology for managing the development of human resources taking into account specific features in federal state organizations has not found full reflection of the modern system of personnel management theory. Within the framework of the work the concept of “personnel potential”, directions of its development both in general and in particular, on the example of the enterprise are considered Federal State Institution “State Agency for Aviation Management of the Ministry of Finance of the Russian Federation” has defined standard and innovative methods for developing human resources potential.*

Keywords: *human resources potential, development and improvement of human resources potential, analysis of human resources potential, the role of human resources potential in the enterprise management system.*

Potential (Latin: potentia) means opportunities that can be used to achieve a goal. The human resources potential of an organization is the capabilities of personnel that can be realized in various areas of production of an enterprise or organization [7, p. 143]. Considering that the potential of an individual includes his knowledge, skills, abilities, the human resources potential of an organization in a broad sense can be defined as the totality of knowledge, skills and abilities of people that they use or may use in the future in a particular job to achieve specific goals [1, p. 120].

At present, the formation of human resources plays an important role in the enterprise management system. This role is determined not only by the need for qualified personnel of the organization, the possibility of increasing the efficiency of its functioning, but also by the presence of demographic problems in the Russian Federation.

The analysis of human resources potential is based on a systemic approach taking into account its constituent elements. The main elements of the structure of human resources potential (Fig. 1) are the same for all types of enterprises and organizations.

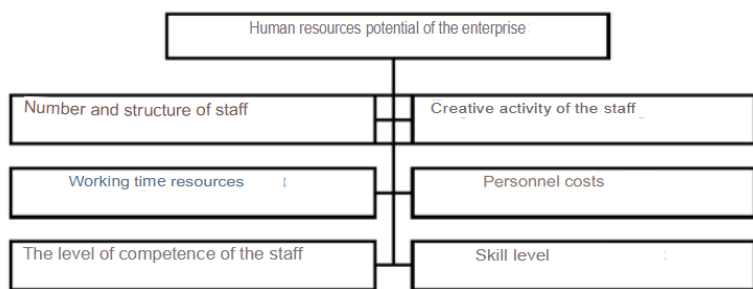


Figure 1. *Elements of the structure of human resources*

The competitiveness of an organization and its economic effect depend on the correct formation of human resources [1, p. 126].

The process of formation of human resources potential, problems arising in the management of human resources potential, were given attention by domestic and foreign specialists. The issues of effective management of enterprise employees, stimulation and motivation of labor are conceptually reflected in the works of Maslow A., Mayo E., Porter L., Taylor F.

Modern specialists Afanasyev V. Y., Vorontsov N.V., Baykova O.V. considered practical methods of analysis and assessment of the organization's human resources potential. Assessment methods, classification of possible approaches to the analysis of human resources potential were carried out by Ryabchuk P.G. and Fedorova K.A. Methods of assessment of human resources potential are devoted to the works of Maksimova L.V., Shoinkhorova V. R, Maksimov I.S. Kibanov A. Y. considered human resources potential within the framework of personnel management, without isolating this concept into a separate category. Gazizov R.R. concentrated on innovative elements in human resources management. Factors and elements of personnel activities influencing the development of the organization's personnel potential were studied by Goncharova N.V., Daineko L.V. Some specialists, for example, Sokol N.Y., studied the processes of formation of human resources in municipal services. However, the methodology of management of development of human resources taking into account specific features in federal government organizations the modern system of personnel management theory was not fully reflected.

The enterprise belongs to federal state institutions Federal State Institution "State Agency of the Ministry of Finance of Russia". The enterprise is subordinate to the Ministry of Finance of the Russian Federation. The main objective of the State Institution of the Ministry of Finance of Russia is to maintain and operate administrative buildings, summer cottages and other facilities assigned to the Ministry of Finance of the Russian Federation.

Organizational structure Federal State Institution "State Agency of the Ministry of Finance of Russia" is presented in Figure 2.

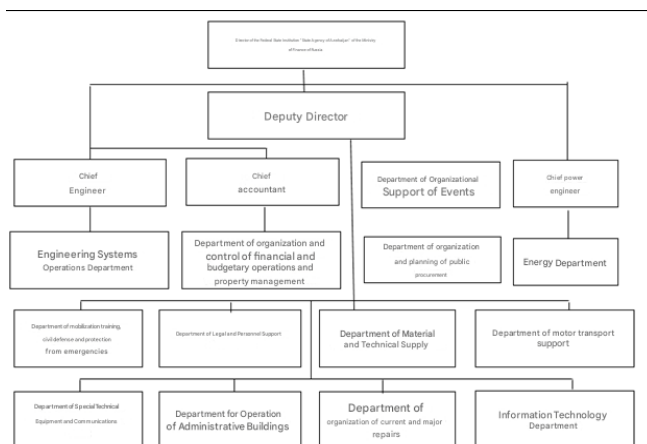


Figure 2. Organizational structure Federal State Institution "State Agency of the Ministry of Finance of Russia"

Functions assigned to the enterprise The Federal State Institution “State Agency of the Ministry of Finance of Russia” are presented in Figure 3 [6].

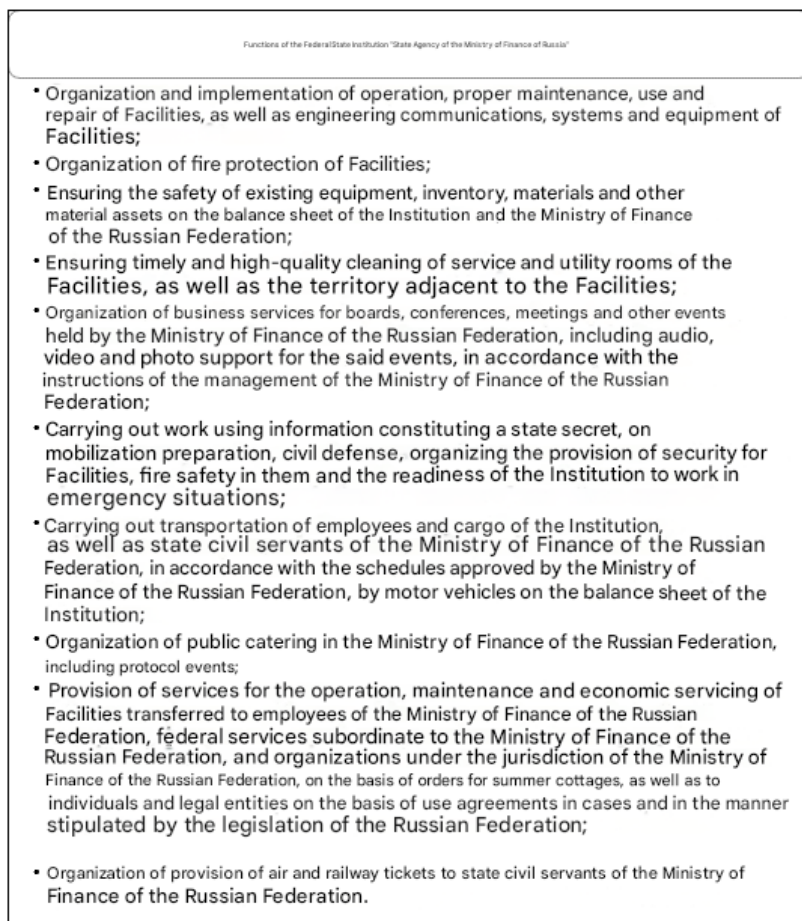


Figure 3. The main tasks and functions of the enterprise Federal State Institution “State Agency of the Ministry of Finance of Russia”

Enterprise activities FKU “GU AZ of the Ministry of Finance of Russia” is aimed at servicing the Ministry of Finance of Russia in various areas.

Income and expenses of the enterprise Federal State Institution “State Agency of the Ministry of Finance of Russia” for 2024 are presented in Tables 1 and 2[6].

Table 1
Income Federal State Institution “State Agency of the Ministry of Finance of Russia” for 2024

Indicator name	total
Budget revenues, total	56 608 328,03
including:	
Fines, penalties, fines paid in the event of a delay in the fulfillment by a supplier (contractor, performer) of obligations stipulated by a government contract concluded by a federal government agency, federal state institution, state corporation (other fines)	3 931 835,77
Other income from the provision of paid services (works) by recipients of Federal budget funds (other income from the provision of paid services (works) by other federal government institutions)	20 588 164,10
Income received as reimbursement for expenses incurred in connection with the operation of federal property (federal state institutions)	28 761 277,95
Other income from compensation of federal budget expenses (funds received from the activities of other institutions)	2 535 026,02
Income from the sale of property under the operational management of federal institutions (except for the property of federal budgetary and autonomous institutions), in terms of the sale of material reserves for the said property (federal state institutions)	430 551,76
Other fines, penalties, fines paid in accordance with the law or contract in the event of failure to fulfill or improper fulfillment of obligations to a federal government agency, federal state institution, the Central Bank of the Russian Federation, state corporation (other fines)	288 605,53
Revenues from monetary penalties (fines) received to pay off debts incurred before January 1, 2020, subject to transfer to the federal budget in accordance with the standards in effect in 2019 (except for revenues allocated to the formation of the Federal Road Fund)	72 866,90

The main sources of income are:

-other income from the provision of paid services (works) by recipients of federal budget funds (other income from the provision of paid services (works) by other federal government institutions);

- income received as compensation for expenses incurred in connection with the operation of federal property (federal state institutions).

Revenue receipts for 2024 have been fully met.

Table 2
Expenses Federal State Institution “State Agency of the Ministry of Finance of Russia” for 2024

Indicator name	Completed	Not fulfilled
	total	according to the limits of budget obligations
Budget expenses, total	1,437,292,652.56	32 701 604,71
Including		
Other purchase of goods, works and services	6 119 892,00	8.00
Institutions' wage fund	481 582 300,00	0,00
Other payments to staff of institutions, with the exception of the wage fund	474 953,60	46.40
Contributions for compulsory social insurance for payments of wages to employees and other payments to employees of institutions	140 201 265,93	2 843 134,07
Purchase of goods, works, services in the field of information and communication technologies	53,030,611.69	839 188,31
Other purchase of goods, works and services	471 390 586,24	10 726 413,76
Benefits, compensations and other social payments to citizens, except for public regulatory obligations	11,410.86	89.14
Enforcement of judicial acts of the Russian Federation and settlement agreements on compensation for damage caused	50 000,00	0,00
Payment of property tax of organizations and land tax	45 155 622,00	78.00
Payment of other taxes and fees	183,943.00	10 357,00
Payment of other payments	5 816,74	83.26
Other purchase of goods, works and services	7,011,951.46	755 248,54
Procurement of energy resources	101 834 666,34	17,511,833.66
Budgetary investments in capital construction projects of state (municipal) property	129 748 419,70	15,037.57
Other purchase of goods, works and services	491 213,00	87.00
Budget execution result (deficit/surplus)	-1 380 684 324,53	X

Budget expenditure items The Federal State Institution “State Agency of the Ministry of Finance of the Russian Federation” have not been fully implemented. As of 01.01.2025, there is a budget deficit. The presence of a budget deficit of the Federal State Institution “State Agency of the Ministry of Finance of the Russian Federation” indicates shortcomings in the enterprise management system.

It should be noted that in the 2023 report, the following data are reflected in the results of monitoring the quality of financial management in relation to federal government agencies subordinate to the Ministry of Finance of the Russian Federation [6]:

- assessment of the quality of management of federal budget expenditures of the enterprise FKU “GU AZ of the Ministry of Finance of Russia” - 84.36%;
- quality of formation of Information on budgetary obligations – 97.16%;
- the number of complaints regarding violations in the area of procurement of goods, works and services recognized as justified by the Federal Antimonopoly Service – 60;
- the error in cash planning of federal budget expenditures on social security is 100%.

Thus, there are shortcomings in the management system, namely in the area of financial management, the solution of which will improve the quality of the enterprise’s work.

It should be noted that as of 01.01.2025, the company had the following vacancies in Moscow:

- leading engineer for working with engineering systems and equipment;
- Leading Legal Adviser;
- leading engineer for maintenance of water supply, sewerage and heating systems;
- Leading engineer for working with systems software;
- street cleaner;
- repairman;
- loader-general worker.

As of 01.04.2025, the list of vacancies has not changed. Consequently, the enterprise has problems with hiring personnel in general, and in particular with managing human resources.

To solve problems in the human resources management system at the Federal State Institution “State Agency of the Ministry of Finance of Russia”, the following measures are proposed:

- analysis and adjustment of individual employee development plans;
- career guidance work among graduates of special educational institutions;
- providing young professionals with favorable conditions for realizing their needs for self-respect, knowledge, and achieving independence;
- improving the system of non-material incentives for employees;
- staff training;
- update documents in the field of personnel policy.

The approach to the development of human resources also involves the introduction of innovative elements in terms of searching, attracting and using person-

nel, in terms of personnel adaptation, in terms of personnel training and development, such as

- formation of an information database on personnel needs, necessary qualifications and competencies;
- implementation of a dual education system.

The social efficiency of the proposed measures consists of reducing the labor intensity in searching for information on personnel needs, timely planning for personnel training and advanced training; achieving the required number of employees, closing vacancies, as well as achieving compliance of the development of personnel potential with the needs of the organization.

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评估采矿企业业务流程经济效率的现代方法

**MODERN APPROACHES TO ASSESSING THE ECONOMIC
EFFICIENCY OF BUSINESS PROCESSES IN MINING
ENTERPRISES**

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The activity of an organization, regardless of its organizational and legal form and sphere of functioning, is based on the implementation of certain business processes. It is these processes that make it possible to solve a wide range of tasks specific to both commercial and non-commercial structures. Business processes are used to structure and optimize internal interactions between employees aimed at achieving strategic and operational goals [1].

A business process is usually understood as a logically completed set of actions aimed at achieving a specific result with consumer or intrinsic value. There are many interpretations of this concept in literature. Russian researchers (Maslevich, Rodtsevich, Repin, Popova) focus on the value and operational component of the processes, emphasizing their structure and focus on the result [2]. Foreign scientists (Porter, Scheer, Hammer and Champy, Rother, Ak off) focus on consistency, consistency, integration into the business model and continuous improvement of processes in kaizen logic [3] (Table 1). At the same time, each business process is a closed cycle with clearly defined inputs, outputs, resources and management mechanisms (Fig. 1).

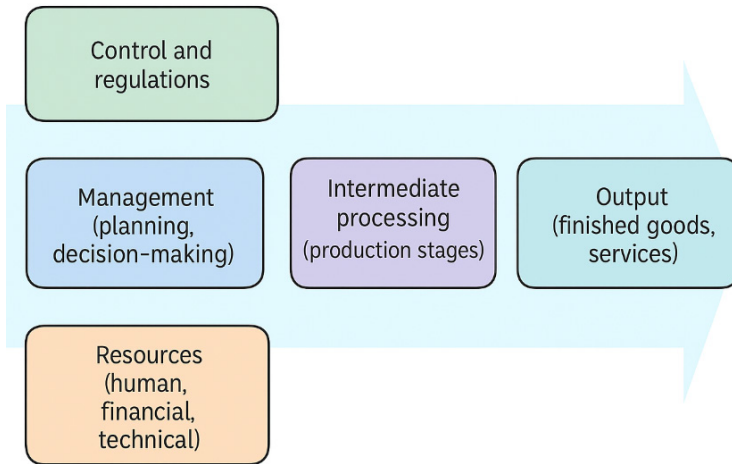


Figure 1. Basic scheme for converting input resources into the result

The result is a key element of any business process. Any activity that does not have a final, measurable outcome loses its significance and turns into a haphazard expenditure of time and resources.

Table 1
Comparative analysis of business process definitions

Author	Approach	Main Focus
Rodzevich O.N.	Logical-sequential	Structure and completeness
Repin V.V.	Operational	Inputs and outputs, measurability
Porter M.	Strategic	Value chain
Hammer, Champy	Reformative	Radical rethinking of processes
Scheer A.W.	Modeling	Visualization and ARIS-based management

Obviously, regardless of the terminology base, the general understanding boils down to the fact that business processes are the “skeleton” of an enterprise’s activities. Without structuring them, neither management nor development is possible [4].

Classification of business processes: a systematic view of the most common classification is the division into:

- basic (aimed at creating products: mining, enrichment).
- auxiliary (provision of conditions: repair, supply, logistics).
- management (planning, budgeting, quality control).

Further refinement of the business process structure is possible based on several additional features:

- on interaction with the external environment (local and external).
- by the nature of the functions (organizational, applied).
- by type of resources (resource, production, innovation, etc.).

Practical aspect: the scheme of business process formation in an enterprise the formation of business processes takes place in stages, starting with the analysis of the current state (the so-called AS-IS model), and ending with the implementation of improvements (TO-BE model). In this way, BPMN and IDEF0 methodologies are used, which make it possible to formalize all actions and identify “bottlenecks” [5].

In the mining industry, special attention is paid to process reengineering (BPR), as enterprises operate in conditions of high capital intensity, resource and environmental risks, as well as pressure from international standards (ISO, ESG). Therefore, the need to restructure the logic of processes is not a fashion trend, but a condition for survival and scaling.

Assessing the economic efficiency of business processes is a critical task in the context of increasing competition and the need for rational use of resources in the mining sector. The urgency of this problem is reinforced by the industry’s capital intensity, high technological barrier to entry, and export orientation. The main economic meaning of evaluating the effectiveness of business processes is to establish the relationship between the achieved result and the costs necessary to obtain it. However, the specifics of mining processes, especially stripping, drilling, and ore processing, require considering their inherent efficiency, that is, the ability of the process to produce results even without direct financial returns at the initial stages.

Traditionally, profitability indicators are used – ROA (return on assets), ROE (return on equity), ROS (return on sales) [6]. They allow you to assess how effectively the company’s property, equity and revenue are being used. For example, $ROA = \text{Net Profit} / \text{The average value of assets}$ shows how much return is provided for each ruble of investments in property. However, profitability coefficients alone are not sufficient for a comprehensive assessment of processes. They do not take into account the time factor, which means they cannot adequately reflect the long-term value of investment measures that are typical of capital-intensive industries. Cash flow discounting methods allow you to correctly account for the time value of money. The main indicator is the Net Present Value (NPV), calculated as the difference between the reported income and the cost of the project. The positive NPV value indicates that the project creates added value and can be implemented. The second key indicator is the Internal Rate of Return (IRR). This is a discount rate at which the NPV of the project becomes zero. If the IRR exceeds the cost of

capital (WACC), the project is considered effective. This criterion is especially important when comparing alternative projects. Of additional importance is the Discounted Payback Period (DPP), which indicates how long the investment will take, considering discounting. DPP is important in industries with a high proportion of technological risks.

Table 2
Interpretation of NPV, IRR and DPP values

Indicator	Meaning	Managerial Decision
NPV > 0	Project is effective	Proceed with implementation
IRR > WACC	Return exceeds cost of capital	Increased investment attractiveness
DPP → 0	Quick payback	Low project risk

The Economic Value-Added Index (EVA) is also used to comprehensively assess the effectiveness of business processes. Unlike NPV and IRR, it allows you to evaluate the effectiveness of using already raised capital in current operating activities. A high EVA value indicates that the company can generate profits exceeding the cost of the attracted resources [7].

In practice, EVA is associated with profitability, financial stability, competitiveness, and even environmental and social efficiency. In modern conditions, when enterprises strive to meet the standards of sustainable development (ESG), such expanded metrics become especially important.

Despite methodological sophistication, most of the considered indicators are focused on project activities. However, in mining enterprises with a continuous production cycle and multiple parallel processes, it is necessary to adapt these models to evaluate business processes. For example, the integration of NPV and IRR indicators into the KPI system at the level of enrichment, transportation, or equipment maintenance processes [8].

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莫斯科地区农业用地管理的国家监管和市场机制
**STATE REGULATION AND MARKET MECHANISMS FOR
MANAGING AGRICULTURAL LAND USE IN THE MOSCOW
REGION**

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摘要：本文探讨了高度城市化的莫斯科地区农业用地开发问题。分析了高产农田减少及其质量退化的趋势，以及对这些土地用于其他用途的制度限制。特别关注如何在土地利用调控的行政机制与市场机制之间找到最佳平衡。提出了基于土地利用数字化的差异化调控方法和改进农业用地使用者支持措施，对现有体系进行现代化改造的具体措施。本文面向土地关系、区域管理和地方自治领域的专家。

关键词：土地、农业、粮食安全、农业部门、现代技术。

Abstract. *The article discusses the problems of creating agricultural land use in the highly urbanized Moscow region. Trends in the reduction of highly productive farmland and its qualitative degradation, as well as institutional restrictions on the occupation of these lands for other purposes, are analyzed. Particular attention is paid to finding the optimal balance between administrative and market mechanisms for regulating land use. Specific measures are proposed to modernize the existing system based on a differentiated approach to regulation based on digitalization of land use and improvement of measures to support agricultural land users. The article is addressed to specialists in the field of land relations, regional management and local self-government.*

Keywords: *Land, agriculture, food security, agricultural sector, modern technologies.*

In order to ensure the country's food security, the efficient use of agricultural lands specially protected by the state is of particular importance. The Doctrine of Food Security of the Russian Federation, approved by the Decree of the President of the Russian Federation of January 21, 2020 No. 20, sets the task of increasing the share of domestic agricultural products, which requires not only an increase in production volumes, but also the rational use of land. This is especially true for regions with a high demand for land not only for agriculture, but also for residential development and many other infrastructure projects. This primarily affects the effective system of agricultural land use that has developed in the region. Hence, the combination of state regulation of land use and market mechanisms for creating efficient land use is of particular importance. Achieving this balance is a complex organizational, legal and political task. On the one hand, strict control over the rational use of land resources is needed, and on the other, it is necessary to create favorable conditions for their economic efficiency, social justice and environmental sustainability. State regulation of the most important branch of agricultural land use performs here the strategic function of preserving the land fund as a national asset, which includes a set of measures to control the targeted use of agricultural land. Of great importance is the classification of land into the appropriate categories, the establishment of special regimes for the use of valuable agricultural land and specially protected natural areas, as well as the development of long-term programs for the integrated development of rural areas. In this important matter, a key role is played by market mechanisms that ensure the economic efficiency of land use: lease relations, mortgage lending, land turnover (land market) and other financial and economic instruments that stimulate the rational use of land resources, attracting investment in the development of primarily rural areas. Market mechanisms make it possible to identify the real value of land plots, optimize their use and redistribute resources to the most effective sectors of the regional economy [1].

The main problem is to find the optimal balance between these two approaches. Excessive strengthening of state regulation and control often leads to a decrease in the investment attractiveness of a region, bureaucratization of the solution of land problems and a slowdown in socio-economic development. At the same time, the prevalence of market mechanisms without proper regulation leads to land speculation, improper use of especially valuable agricultural land, deterioration of their condition and improper use. environmental situation.

All this requires the development of a differentiated approach that takes into account the specifics of various land categories and regional characteristics. For valuable agricultural lands and specially protected natural areas, a regulatory approach with clear restrictions should prevail, and for residential and industrial lands, market mechanisms can be applied while maintaining urban planning and environmental balance in the region and municipalities.

The most important instrument here is the system of economic regulation based on the principles of stimulating influence. It includes differentiation of the tax burden depending on the natural value of the land, targeted subsidies for the introduction of nature-saving technologies, as well as special credit mechanisms.

Modern technologies of spatial analysis, in particular geographic information systems (GIS) and remote monitoring methods, significantly increase the efficiency of public administration and market territorial redistribution of land resources. These technological solutions allow implementing the principle of double impact, ensuring simultaneously environmental sustainability and economic efficiency of land use. Economic efficiency of land use is determined by the system of market institutions that form a complex of stimulating effects. In this context, the institution of market turnover of land plots, a dynamic system of lease legal relations and mortgage lending mechanisms are of key importance, which in their totality create economic incentives for land use optimization, conditions for attracting investment resources and prerequisites for technological modernization [2].

The functioning of the specified market instruments forms an institutional matrix of sustainable land management, ensuring a synergistic effect of the interaction of environmental and economic factors of territorial development. From a methodological point of view, this system allows for the implementation of the Pareto-optimality principle in the distribution of land resources, thereby achieving a balanced relationship between the conservation and operational functions of land use. In this case, the most important aspect is the ability of market mechanisms to self-regulate, which, in combination with government regulation, forms a sustainable management model adaptive to changing socio-economic and environmental conditions [3].

The challenges associated with the pressure of sanctions and the need to ensure food sovereignty are making the search for effective models of land management more urgent. Of particular importance is the harmonization of state regulation and market mechanisms, which, on the one hand, allows for the prevention of misuse of land, and on the other, for the creation of incentives for investment in the agro-industrial complex [4].

The Moscow Region, being a dynamically developing region with a high anthropogenic load on the land fund, is of particular interest for the study of this problem. The issue of balance between the development of agriculture, the needs of urbanization and the preservation of the ecological framework of the territory is acute here, while traditional approaches to land use are often insufficiently effective in the context of new economic realities. In this regard, the study of innovative mechanisms for land management that can ensure the sustainable development of rural areas of the Moscow Region is of particular relevance. The key task is to find the optimal combination of administrative and market instruments that will ensure

the fulfillment of the indicators of the Doctrine of Food Security, increase the investment attractiveness of agricultural production and prevent the degradation of the region's land resources.

Moscow Region has significant potential for the effective development of agricultural land use. With a highly urbanized territory, the region demonstrates good results in the agricultural sector. The volume of gross product brings the region into the top three leading regions. The rural population of the region is about 1.8 million people - the second figure in Russia after Krasnodar Krai. This unique demographic situation creates the necessary potential for the successful development of the agro-industrial complex.

The economic indicators of the agro-industrial complex are impressive: the annual production volume exceeds 250 billion rubles, the share of the agro-industrial complex in the region's GRP is 4-5%, more than 500 large and medium-sized agricultural enterprises and over 5 thousand farms operate in the region.

In the Moscow Region, technological modernization of the agro-industrial complex is combined with a favorable economic and geographical position. The region is actively introducing industrial greenhouse complexes with an area of over 300 hectares of closed soil, precision farming systems using GPS navigation and IoT monitoring, automated farms with digital control, as well as modern biotechnology, including hydroponic cultivation methods and genomic selection of agricultural crops.

The strategic location in close proximity to the capital's metropolis creates competitive advantages in the form of a developed logistics infrastructure and access to the largest national scientific centers, distribution centers and processing of agricultural products. However, the efficiency of using this potential is limited by systemic restrictions, among which the following should be highlighted: a shortage of highly qualified labor resources, increased capital intensity of land use, intense competition with imported goods, as well as increasingly stringent environmental standards.

Prospective vectors for the development of the region's agro-industrial complex should be focused on the formation of specialized production clusters focused on high-margin agricultural crops, the introduction of organic land management principles, technological modernization based on resource-saving methods and comprehensive digital transformation of production cycles. The implementation of these areas requires the development and implementation of a coordinated program of technological re-equipment that takes into account both the specific features of the regional agroecosystem and the dynamics of macroeconomic indicators and market conditions.

The problem is particularly relevant due to the fact that the reduction of agricultural land is occurring against the backdrop of the growth of the population of the Moscow Region and the increase in demand for local agricultural products. This disproportion requires immediate measures to reform land policy, including stimulating the turnover of agricultural land, optimizing the mechanisms for leasing state land, introducing modern land use monitoring systems, and developing targeted support programs for agricultural producers.

The structure of the land fund of the Moscow region has undergone significant changes over the past ten years, reflecting the dynamics of the socio-economic development of the region. Agricultural land, occupying a total area of 1.6 million hectares, remains the most important category of land, but its structure has changed significantly. The greatest concern is the reduction in the area of arable land, which decreased to 1.1 million hectares, which is associated with both natural soil degradation processes and the transfer of part of the land to other categories. At the same time, pastures retain an area of about 0.23 million hectares, and hayfields - 0.18 million hectares, which indicates the preservation of the livestock specialization of the region. Significant changes have occurred in the category of lands of populated areas, the area of which increased to 0.57 million hectares. This growth is due to active processes of urbanization and housing construction, especially in the areas adjacent to Moscow. The forest fund, occupying 1.8 million hectares, retains a leading position in the structure of land use in the region. These territories play an important role in maintaining the ecological balance of the region and are an important recreational resource for the multi-million population. The category of other lands, including industrial zones, transport communications and water bodies, is about 0.5 million hectares, whose share is gradually increasing due to the development of infrastructure and industrial production in the region.

The dynamics of changes in the land fund over the past decade shows a steady trend towards a reduction in agricultural land, which is well illustrated by the dynamics of changes in the sown areas of agricultural crops in the Moscow region (Fig. 1).

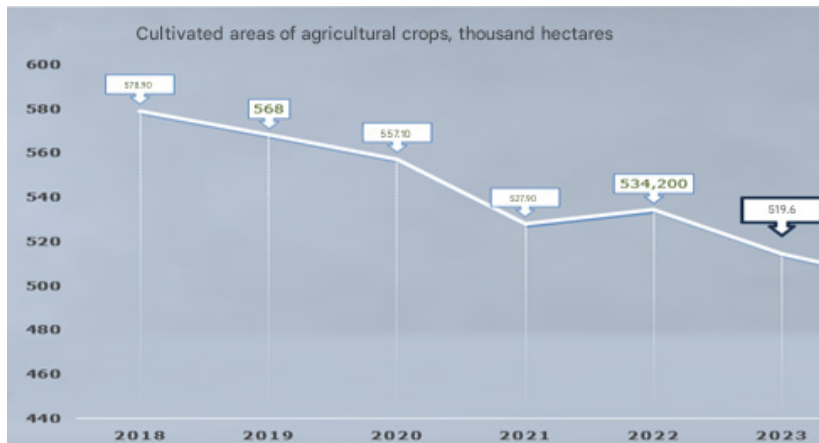


Figure 1. "Area of sown agricultural crops"

The land fund of the Moscow region is undergoing a profound structural transformation caused by a complex of interrelated factors. The most significant of them is the unprecedented urbanization pressure, typical for a developed region. Every year, agricultural turnover loses several thousand hectares of valuable land, which are transferred to cottage development, commercial facilities and transport infrastructure. This process is especially intense along the new highways - the Central Ring Road and the Moscow Central Diameters, where land plots are rapidly changing their intended purpose.

Continuing current trends poses serious risks to the sustainable development of the region. The ongoing reduction of agricultural land threatens food security not only for the region, but also for the capital region as a whole. The environmental consequences of land degradation are already manifested in increased flooding, reduced biodiversity and deterioration of the general state of the environment. Social aspects of the problem include increased tension in rural areas due to changes in traditional lifestyles and job losses in the agro-industrial sector [5].

In these conditions, it is necessary to develop fundamentally new approaches to land policy, taking into account both the specifics of individual territories and the strategic priorities for the development of the entire region. A differentiated mechanism for land management is needed, which will allow us to simultaneously solve the problems of preserving productive lands, increasing the efficiency of their use and creating conditions for attracting investment in the agro-industrial complex. Particular attention should be paid to the development of modern forms of land use, including the introduction of resource-saving technologies and the creation of economic incentives for the preservation of valuable agricultural lands.

The system of farm support in the region includes several effective mechanisms. The most popular measure remains subsidizing interest rates on loans, which allows to significantly reduce the financial burden on agricultural producers. Another significant tool is the program of preferential leasing of agricultural machinery, thanks to which the fleet of agricultural machinery is annually updated for the amount of more than 500 million rubles.

With the key rate of the Central Bank of the Russian Federation remaining at the current level of 21%, the interest rate subsidy program is becoming a vital tool for supporting the agro-industrial complex of the Moscow Region. The current situation on the credit market is characterized by a sharp increase in the cost of borrowed funds - average market rates on loans for the agro-industrial complex have reached 25-30% per annum, while loan terms have been reduced from 5-7 to 2-3 years and collateral requirements have been tightened by 30-40%. This has led to a reduction in the loan portfolio of agricultural organizations by more than 20% in 2023-2024 and has put many farms at real risk of bankruptcy.

In the current conditions, the current subsidy mechanism requires significant adjustment. For beginning farmers, farms implementing import-substituting technologies, and producers of socially significant products, compensation of 100% of the key rate (21%) is offered. Medium and large producers, processing enterprises and suppliers of products to social institutions can count on compensation of 2/3 of the key rate (10.67%). Special conditions (compensation up to 18%) are provided for land reclamation projects, the purchase of Russian agricultural machinery and the construction of greenhouse complexes.

The effectiveness of subsidies in the current conditions is confirmed by specific results: reducing the financial burden from 24% to 6-8% of the effective rate allows maintaining profitability at the level of 12-15% against the predicted 3-5%. This not only prevents bankruptcy of up to 30% of farms at risk, but also ensures the preservation of a large number of jobs in rural areas.

However, to enhance the effectiveness of support measures, it is necessary to urgently increase the subsidy budget, as well as introduce a deferment of payments on subsidized loans and develop special credit products for seasonal financing, replenishment of working capital of agricultural enterprises and refinancing of current debt. The preservation of food security in the region depends on the promptness of these decisions - without strengthening support measures, the Moscow Region risks losing up to 20% of small and medium agricultural producers during 2025, which will lead to a significant reduction in local production and increased dependence on imported supplies of agricultural products. In the current economic conditions, subsidizing interest rates ceases to be just a support measure, turning into a strategic tool for maintaining the stability of the entire agro-industrial complex of the region.

The main conclusion of the study is that overcoming existing problems requires a comprehensive approach based on a harmonious combination of administrative and market management tools. On the one hand, it is necessary to strengthen state control over the preservation of valuable agricultural land and compliance with their intended use. On the other hand, it is important to consistently develop market mechanisms, including improving rental relations, developing mortgage lending and creating digital platforms for land trade, which will increase the economic efficiency of using land resources.

Of particular importance in this context is the implementation of a differentiated approach to the regulation of various categories of land, the widespread introduction of modern land use monitoring technologies, including geographic information systems and remote sensing methods, as well as the continuous improvement of government support measures for agricultural producers, taking into account changing economic conditions.

The implementation of the proposed set of measures will create an effective land management system that will ensure both the preservation of the agricultural potential of the Moscow Region and its rational use in the interests of sustainable development of the region. The conclusions and recommendations obtained during the study can be used not only to improve the land policy of the Moscow Region, but also in the development of land management strategies in other urbanized regions facing similar challenges and problems.

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零售业价值链的成功整合：亚马逊的例子
**SUCCESSFUL INTEGRATION OF THE VALUE CHAIN IN RETAIL:
THE EXAMPLE OF AMAZON**

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摘要：本文以亚马逊为例，分析了零售业价值链的成功整合。研究考察了亚马逊战略的关键要素，包括通过人工智能实施物流优化、仓库自动化以及自主研发运输解决方案。研究特别关注库存管理、个性化客户服务以及技术（大数据、分析、自动化）在提升运营效率方面的作用。作者强调，包括忠诚度计划（亚马逊Prime）在内的系统性流程整合方法，为公司带来了竞争优势。研究结果表明，在零售业数字化转型的背景下，采用类似的战略可以帮助其他公司提升竞争力和可持续性。

关键词：价值链、零售、亚马逊、人工智能、自动化和机器人技术、库存管理、大数据、客户服务和个性化、运营效率、数字化转型。

Abstract. *The article analyzes the successful integration of the value chain in retail using the example of Amazon. The study examines key elements of Amazon's strategy, including logistics optimization through the implementation of artificial intelligence, warehouse robotization, and the development of its own transport solutions. Particular attention is paid to inventory management, personalization of customer service, and the role of technology (big data, analytics, automation) in improving operational efficiency. The authors emphasize that a systematic approach to process integration, including loyalty programs (Amazon Prime), provides the company with competitive advantages. The results of the study demonstrate that the use of similar strategies can help improve the competitiveness and sustainability of other companies in the context of digital transformation of retail.*

Keywords: *Value chain, retail, Amazon, artificial intelligence, automation and robotics, inventory management, big data, customer service and personalization, operational efficiency, digital transformation.*

Introduction

Retail plays an important role in the economy, providing consumers with goods and services on a global level. However, increasing competition, changing

consumer preferences and technological developments create new challenges for companies. In such conditions, effective integration of the value chain becomes critical for sustainable development and competitiveness of the business. Amazon is a shining example of the successful implementation of this concept, which makes its study especially relevant.

Retailers face a number of challenges in managing their value chain. Key challenges include ensuring fast and accurate delivery, optimizing inventory, reducing costs and improving customer service. Technological change and globalization add additional complexity, requiring companies to continually adapt. These challenges highlight the importance of implementing innovative methods to improve value chain efficiency.

The aim of the study is to analyze the successful integration of the value chain in retail using the example of Amazon. The main objectives include:

1. Study of logistics optimization methods.
2. Analysis of inventory management strategies.
3. Evaluation of approaches to improving the quality of customer service.
4. Assessing the impact of technologies on process efficiency.

To achieve the stated objectives, the study used methods of analysis and synthesis, study of scientific literature and empirical data, as well as a case study using Amazon as an example. An integrated approach allows for a deeper understanding of the mechanisms of the value chain and an assessment of its impact on the overall success of the company.

Concept and structure of the value chain

The value chain, first described by Michael Porter in his 1985 book *Competitive Advantage: Creating and Sustaining Superior Performance*, is the system of processes and activities that an organization performs to create value for its customers. These activities are divided into primary and supporting activities. Understanding and applying this concept is especially important in retail, where business success depends on the ability to offer quality products and services at competitive prices.

The key elements of the value chain include:

1. Incoming logistics: processes involved in receiving, storing and distributing resources needed for production.
2. Operations: converting these resources into a finished product.
3. Output logistics: delivery of finished products to end consumers.
4. Marketing and sales: promoting goods and services on the market.
5. Service: Customer support after purchase.
6. The interaction of these elements forms the basis of the value chain, ensuring the efficient and targeted creation of value for customers.

In retail, the structure of the value chain plays a key role. In this study, the value chain is understood as a sequence of organizations, each of which adds value

to the consumer receiving the final product [1]. Research shows that companies that actively manage their value chain achieve 70% higher operational efficiency. Optimizing each element of this chain allows you to reduce costs, improve service quality, and, of course, reduce order fulfillment time. In a highly competitive retail environment, such aspects are becoming critical for customers.

Thus, the value chain structure is an integral part of the strategy of successful companies, Amazon is no exception. Companies use value chain principles to achieve their strategic goals, ensuring high operational efficiency and customer satisfaction.

The Role of Integration in Improving Retail Efficiency

Integration in retail involves combining various elements of the value chain so that they interact effectively. This includes coordinating processes such as inventory management, logistics, and customer service. In today's market, where customer needs are changing rapidly, integration is becoming an important tool for achieving flexibility and adaptability.

Integration in the value chain brings many benefits, such as increased efficiency, reduced costs and improved service quality. It helps companies minimize time losses due to inconsistency between different departments. As Kuchkovsky notes, "creating a favorable working environment, supporting employee initiatives and encouraging teamwork contribute to increased business efficiency and sustainability" [2]. Thus, process integration is a key factor for achieving success in today's environment.

One of the most striking examples of successful integration in retail is the work of Amazon. With more than 175 fulfillment centers around the world, Amazon demonstrates how the coordinated work of logistics and warehouse processes allows for the efficient processing of a huge number of orders. In 2020, Amazon processed more than 4.2 billion orders, which was made possible by the integrated inventory management system. This highlights that the correct use of integration significantly affects the achievement of outstanding results in retail.

Logistics Optimization Strategies

Amazon is a pioneer in using advanced technologies to optimize logistics processes. At the core of its strategy is the use of artificial intelligence (AI) and machine learning, which allow it to analyze huge amounts of data and improve delivery routes. These solutions not only reduce transportation costs, but also reduce transit times, providing a competitive advantage. Machine learning algorithms predict the most efficient routes, minimizing delays and costs. For example, the route optimization system takes into account factors such as traffic congestion, weather conditions, and product demand, making delivery fast and cost-effective.

Amazon's warehouse operations have undergone significant automation, particularly through the use of mobile robots. The company's revolutionary move —

the acquisition of Kiva Systems in 2012 — enabled the implementation of unique robotic systems. KIVA robots transport goods within warehouses, precisely coordinating their actions via a central computer. This reduces human involvement, minimizes errors, and increases productivity by 20–40%, according to analysts. As a result, goods reach pickup points faster, and human operators can focus on more complex tasks.

Another key element of Amazon's strategy is the development of its own transport infrastructure. In the 2000s, the company began to form an aircraft fleet, acquiring more than 100 aircraft. This decision allowed it to reduce its dependence on external logistics partners, ensuring control over the timing and safety of transportation. Amazon's current fleet consists of more than 1,200 aircraft, making it one of the largest airlines in the United States. This approach not only minimizes the risks associated with external suppliers, but also reduces the cost of delivery due to the scale of operations.

Amazon's adaptability, which Shirvani wrote about, is manifested in the company's ability to quickly reconfigure its assets to new conditions. For example, during the pandemic, the demand for online sales increased several times. Amazon quickly expanded the number of warehouses, increased the number of employees, and accelerated the implementation of new technologies, such as drones for delivery. This allowed the company not only to maintain but also to strengthen its position in the market.

Central to Amazon's success is its use of data. The company's database includes information on more than 300 million active users, allowing it to accurately forecast demand for products. Analyzing customer behavior, seasonal trends, and regional characteristics helps optimize inventory: avoiding excess products that may become outdated and shortages of popular products. This reduces storage costs and lost potential sales.

The Prime program has revolutionized the fast-shipping market. More than 200 million items are available to Prime customers with delivery within 1-2 days, which is significantly higher than industry standards. This approach has increased customer loyalty: according to surveys, 75% of Prime users are willing to pay an annual subscription for convenience.

Tracking and data analytics technologies play a key role in delivery accuracy. Amazon uses GPS trackers to track the location of products in real time, and machine learning algorithms analyze historical data to predict demand and minimize delays.

Prime Air, which is still in testing, is a showcase for the future of logistics. Drones developed by Amazon are capable of delivering items weighing up to 5 kg within 30 minutes. This solution could dramatically reduce delivery times to hard-to-reach areas and improve customer satisfaction.

Ultimately, Amazon's innovations don't just speed up processes; they also create additional value for customers. Fast, reliable, and predictable delivery, inventory management, and the use of data all form the basis of the company's competitiveness. Amazon's success confirms that the integration of technology, automation, and customer focus remains the key to success in modern retail.

Using Big Data and Analytics

Big Data plays a key role in Amazon's supply chain management, enabling the company to process vast amounts of information related to orders, suppliers, and customers. Amazon processes over a million orders daily, requiring the use of powerful analytical tools to optimize logistics processes. An example of working with Big Data is optimizing delivery routes [8]. To carry out such work, it is necessary to collect millions of gigabytes of information.

Amazon actively uses analytical technologies and machine learning algorithms to predict demand for goods. This allows the company to determine in advance which products will be popular, and then optimize stocks. This approach helps minimize storage costs and prevent shortages of goods. For example, thanks to these technologies, Amazon can plan the purchase of goods in warehouses in advance, which ensures uninterrupted satisfaction of customer requests.

The second example of Big Data use is Amazon's recommendation system. Using information about user preferences and behavior, the company creates customized offers that match the interests of each customer. This not only improves the user experience, but also significantly increases the company's revenue, bringing in up to 35% of total sales.

Big data also has a significant impact on Amazon's strategic decisions. Using analytics platforms such as Amazon Web Services (AWS), the company analyzes key metrics that subsequently influence strategic decisions. These decisions affect both internal processes and interactions with external customers. AWS provides solutions for processing big data that are used both internally and to provide services to other organizations. This allows Amazon to increase revenue and expand its reach, creating "a competitive advantage for both companies offering digital products (such as Amazon, Apple, or Netflix) and for other enterprises" [9].

Automation and robotization in logistics

The last thing I would like to note is the automation of logistics processes. The company is actively implementing automated systems that allow minimizing the time spent on processing orders and reducing the likelihood of errors. For example, the use of specialized software to optimize delivery routes allows Amazon to reduce delivery time, which is an important competitive advantage in the retail market.

Robotics are central to Amazon's warehouse operations. The company has more than 520,000 robots operating in its warehouses, significantly increasing the

speed at which orders can be processed. Amazon Robotics technology automates the movement of goods within warehouses, reducing labor costs and increasing productivity. This is especially important during periods of high demand, such as the holiday season.

Automation of logistics processes at Amazon has a direct impact on improving the value chain. The introduction of autonomous delivery robots (Amazon Scout) allows for faster and more environmentally friendly delivery. In addition, automation helps improve the accuracy of order fulfillment, increases customer satisfaction, and strengthens brand loyalty.

Conclusion

This study conducted a comprehensive and in-depth assessment of the methods used by Amazon to integrate and optimize its value chain. The analysis examined key aspects such as logistics, inventory management, customer service, and the implementation of advanced technologies. The study showed that Amazon's success is due to its systematic and comprehensive approach to managing all elements of the value chain. This allows the company to effectively respond to the challenges of modern retail.

The obtained results emphasize the importance of implementing integration strategies in retail to improve competitiveness and business sustainability. The practical significance of this study lies in the possibility of applying the identified approaches and methods to other companies seeking to improve their operational processes.

Future research may focus on examining in more detail the impact of emerging technological innovations such as artificial intelligence, automation and big data analytics on value chain optimization.

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谁统治现代俄罗斯：定义统治集团并评估其对“精英”概念的遵循
**WHO GOVERNS MODERN RUSSIA: DEFINING THE RULING
GROUP AND ASSESSING ITS COMPLIANCE WITH THE
CONCEPT OF “ELITE”**

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Lugansk State University named after Vladimir Dahl

摘要：通常，统治阶级被理解为一小群拥有特殊权利的人，他们占据领导地位，直接影响国家立法和政治局势的形成。历史上有很多统治阶级失去权力的例子，最常见的原因是公民日益增长的不满。然而，前任领导人总是被其他人取代，他们建立自己的规则，推行自己的政策。对于现代俄罗斯来说，精英阶层及其构成、能力和专业性问题尤为重要。需要一个赢得民众信任，并能够承担起实施必要改革的责任的统治阶级。由此引出了一个问题：谁代表当今俄罗斯的统治阶级？他们能被视为精英吗？政治精英在俄罗斯的影响力正变得尤为显著，因为这一群体在改革实施中发挥着关键作用，社会发展的轨迹取决于他们的行动。

关键词：精英，统治阶级，政治精英，真正的精英。

Abstract. Usually, the ruling class is understood as a small group of people with special rights who occupy leadership positions and directly influence the formation of legislation and the political situation in the state. History knows many examples when the ruling class lost power, most often due to growing discontent among citizens. However, the previous leaders were always replaced by others, establishing their own rules and pursuing their own policies. For modern Russia, issues related to the elite, its composition, competencies and professionalism are of particular importance. There is a need for a ruling class that the population would trust and which would be able to take responsibility for implementing the necessary reforms. In this regard, the question arises: who represents the ruling class in Russia today and can it be considered an elite? The influence of the political elite in Russia is becoming especially significant in the context of the fact that this group of people plays a key role in the implementation of reforms, and the trajectory of society's development depends on its actions.

Keywords: elite, ruling class, political elite, real elite.

Throughout human history, two main groups can be distinguished in any society: those who directly participate in governance and those who obey their decisions. The ruling class, having the exclusive right to power, implements certain political goals, while the majority of the population, significantly exceeding it in numbers, is forced to obey. Historically, one person cannot effectively govern a large group of people, so a ruling class is formed around the leader - an organized minority that supports him. For the majority of the population, the power of this minority seems insurmountable, since it is easier for the minority to organize due to its small number. The minority has always enjoyed great advantages: first of all, this is power, then - access to significant material resources, as well as the presence of personal qualities that are valued in the society where they are. The works of I.A. Androsenko [1], A.G. Ashin [2], N.A. Baranov [3], A.V. Duka [4], A.V. Ponedelkov [8], A.V. Selezneva [9] and other Russian scientists are devoted to the study of the Russian elite. The works of these authors conclude that the human capital of the ruling elite plays an important role, on which the present and future of the country depend.

The emergence of the ruling class can be considered from the point of view of morphology, highlighting two main approaches to explaining its origin. The first is exogenous, suggesting the arrival of power from outside, and the second is endogenous, considering the formation of a political minority within society itself. Many researchers on this topic are inclined to the endogenous model of the emergence of power, explaining this by the innate desire of individuals to dominate.[5].

Various social structures are used to maintain positions of power, including political parties, non-profit associations, religious organizations, the armed forces, and the educational system.

The Russian elite has a unique culture that has been formed over centuries and is based on the legacy of past generations. Key features of the modern ruling elite include the dominant role of the executive branch of power, a high degree of personnel rotation and competition within the elite group. The representatives of power themselves form a hierarchical structure resembling a pyramid, where at the top there is a small number of the most influential individuals.[6].

An early example of the relationship between leaders and followers can be seen in the relationship between the prince and his retinue. The retinue was loyal to the prince, supported him in governing the state, and accompanied him on military campaigns. The "Table of Ranks," created in 1772, formalized the structure and high status of the ruling elite. In the 20th century, the rulers became known as the "nomenklatura," characterized by a rigid hierarchy, lack of rivalry, and relative equality among members.

However, in the 1980s, with the change in the political situation, a counter-elite was formed, which included participants in the democratic movement.

Democratic elections of managers replaced the previous nomenklatura principle. The modern political elite was formed in the 1990s as an opposition to the Soviet nomenklatura.

The history of the development of the modern elite is divided into two stages: the first is the period of B. N. Yeltsin's rule, the second is the period from the beginning of V. V. Putin's rule to the present. During Yeltsin's rule, the political elite failed to consolidate, which led to chaos and the absence of a clear democratic division of power. Putin, in turn, restored centralized power, putting the management system in order.[7].

After 1991, the Russian political elite changed significantly, forming a new political entity. However, the renewal was not complete: its structure included people from the Soviet nomenklatura, who were joined by energetic newcomers, mainly from the business environment. A kind of "refreshment" of the established elite took place.

During the reign of B. Yeltsin, there was a rapid change of personnel, frequent reshuffles and resignations, which led to the depletion of the personnel reserve. With the coming to power of V. Putin, a strengthening of the vertical of power is observed. The administrative reform carried out by him, although it increased the salaries of officials, did not lead to a reduction in their number and contributed to horizontal mobility instead of vertical.

It is worth noting that in the 21st century the face of the political elite is changing: the level of public trust in the ruling class is growing. In the process of redistribution of powers between the center and the regions, the latter receive more power and political independence, which strengthens the role of the regional elite, which is increasingly reaching the federal level and receiving promotions.

The modern political elite consists of several groups that perform certain functions and have varying degrees of influence. These groups, closely interacting, compete for power and influence in society. The dominant positions are occupied by the central political elite, the regional political elite and the economic elite. Below them are the cultural, security and military elites: the heads of the Ministry of Internal Affairs, the FSB and other significant public organizations. The new elite also includes representatives of criminal structures capable of exerting a significant influence on social processes.

Despite the rotation of personnel in the political elite, key positions in the hierarchy of power remain stable. In modern Russia, the political elite is represented by the president, the head of government, members of the cabinet of ministers, members of parliament, leaders of influential public associations and other significant figures. During the 21st century, there has been an increase in the number of the ruling class, approximately threefold.

At the beginning of his presidency, Vladimir Putin relied on a team formed under Boris Yeltsin, but over time many of these people left their posts. The so-

called Yeltsin “family” exerted significant influence on Putin at the dawn of his rule. Then a group of highly qualified officials who worked with him before the presidency appeared, often called “Putin’s liberals” headed by G. Gref and A. Kudrin. Another influential group is the siloviki, executors appointed to implement specific tasks. They are considered one of the most influential and tough groups seeking control over key sectors of the economy, including large state structures such as Rosoboronexport, the Customs Service, Gazprom and Aeroflot. In the 21st century, the heads of large state corporations play an increasingly significant role in economic matters. An example of this are Alexey Miller (Gazprom) and Alexey Sechin (Rosneft), who entered the inner circle of V.V. Putin. The group of ideologists includes A. Miller, D. Medvedev and D. Kozak.

Political scientists distinguish two types of power elite: bureaucratic and oligarchic. Bureaucrats are individuals who act within the established rules and specialize in management, while the oligarchic elite is based on the symbiosis of economic and political influence, where the bureaucracy gets rich. In this case, the fusion of state power with business prevails, the oligarchic formation of the elite displaces the service principle.

The elite also includes those close to political figures: referents, consultants, department heads and other representatives of the top management. The professionalism and stability of the elite largely depend on the quality of the near-elite environment.

An integral part of the political landscape is the counter-elite: representatives of the opposition, public organizations, the media, and the scientific intelligentsia who disagree with the current government. The counter-elite, while not at the helm, strives to gain access to power.

In the modern socio-political context of the Russian Federation, there is a dynamic development and activation of the processes of formation of a new social elite, which within the framework of the program “Time of Heroes” is becoming one of the key factors of national revival and strengthening of the state. This initiative creates new social elevators, providing participants of the special military operation with unique opportunities for professional, social and cultural growth, as well as for the realization of their best qualities for the benefit of the country.

Despite the existing challenges, the level of citizens’ trust in the government and the elite is gradually increasing thanks to systemic reforms aimed at strengthening social mobility and creating conditions for the manifestation of heroism, responsibility and true patriotism. During the implementation of the “Time of Heroes” program [10], the Russian elite is getting a chance to become more professional, competent and focused on serving society and the Fatherland.

A key aspect of modern transformations is overcoming outdated privileges and barriers that hinder the development of new leaders capable of leading the country

to prosperity. In the context of active development of civil initiative, expansion of opportunities for participants in a special operation, as well as increasing their social responsibility, a new model of the elite is being formed - one that values merit, efficiency and effectiveness.

The understanding of the elite today goes beyond traditional ideas. The true elite is not only holders of high positions or hereditary representatives of power, but above all those who demonstrate real achievements, professionalism, initiative and patriotism. Within the framework of the program "Time of Heroes", participants who have demonstrated heroism and selflessness receive deserved recognition, which contributes to the formation of a positive image of new social leaders.

Russian politics and public administration are entering an era of renewal. An important factor is the creation of conditions for the formation of an open, transparent and fair mechanism for promotion to the elite. This task includes not only the elimination of vestiges of nomenklatura connections and clan structures, but also the introduction of modern standards of professionalism, responsibility and civil initiative.

Within the framework of the implementation of the "Time of Heroes" program, there is an active expansion of the network of informal contacts, strengthening of ties between participants of the special operation, and acceleration of personnel rotation. This contributes to the formation of a more mobile, competent and socially responsible elite, capable of solving problems at both the regional and federal levels.

Particular importance is attached to the development of civic identity and patriotism among the participants. Their heroic experience and service to the Motherland create new role models, strengthening the moral spirit of society and increasing the level of trust in the authorities. An important aspect is also the prevention of oligarchization of the elite - the creation of conditions for its honest and deserved advancement up the career ladder, focused on professional achievements and real merits, and not on personal connections or heredity.

In modern Russian realities, the priority is not so much limiting elitism as forming a full-fledged, responsible and patriotic elite that is capable of serving the interests of the people and the state. Participants in the "Time of Heroes" program are a kind of new social elite that combines heroism, professionalism and service to the Motherland, which opens up broad social opportunities and new horizons for personal and professional growth.

The renewed elite must become the driving force of social progress, combining the best traditions of national culture and modern standards of governance. In this context, the state and society work together to create conditions in which new heroes who have gone through trials and demonstrated true courage become an example for the entire nation, inspiring new achievements and strengthening national pride.

It is necessary to focus on the reproduction of a highly professional elite, for whom the priority will not be personal enrichment, but improving the well-being of society. Only then will it be possible to speak of the ruling class of Russia as a true elite.

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现代政治动荡语境中的反爱国主义：概念解构与表现分析

**ANTIPATRIOTISM IN THE CONTEXT OF MODERN POLITICAL
TURBULENCE: DECONSTRUCTION OF THE CONCEPT AND
ANALYSIS OF MANIFESTATIONS**

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注释：在全球政治动荡和意识形态冲突加剧的背景下，“爱国主义”概念在关于民族认同和对国家的忠诚的讨论中占据着核心地位。然而，与爱国主义一样，它的对立面——反爱国主义——也日益被提及。本文旨在解构反爱国主义的概念，分析其历史根源和现代表现形式，并评估其对社会政治生活的影响。我们认为，反爱国主义并非一种明确的负面现象，而是一种对国家政策、民族传统和现有社会秩序的批判态度的复杂而多面的表达。

关键词：反爱国主义、爱国主义、民族主义、公民认同、政治反对派、异见。

Annotation. *In the context of global political instability and aggravation of ideological confrontations, the concept of patriotism occupies a central place in the discourse on national identity and loyalty to the state. However, along with patriotism, its antipode – anti-patriotism – is increasingly mentioned. This article aims to deconstruct the concept of anti-patriotism, analyze its historical roots and modern manifestations, and assess its impact on the political life of society. We consider anti-patriotism not as an unambiguously negative phenomenon, but as a complex and multifaceted expression of a critical attitude toward state policy, national traditions, and the existing social order.*

Keywords: *anti-patriotism, patriotism, nationalism, civil identity, political opposition, dissidence.*

The phenomenon of patriotism is the subject of ongoing academic debate. However, examining only one side of the coin – patriotism – leaves an incomplete understanding of the dynamics of the relationship between the individual and the state. The concept of anti-patriotism, often stigmatized and marginalized, deserves close attention, as it reflects important aspects of critical thinking, civic engagement, and political opposition.

Anti-patriotism is a hostile feeling towards one's homeland [1]. This phenomenon can have significant influence and at the same time be dangerous for the life of society. Defining anti-patriotism presents a significant methodological difficulty. Unlike patriotism, which is often associated with love for the homeland, pride in national achievements and readiness to defend the interests of the state, anti-patriotism is usually defined through the denial of these values. However, such a definition is too simplified and does not take into account the diversity of motives and manifestations of anti-patriotic sentiments [3, p. 716].

In general, anti-patriotism today should be considered as a spectrum of positions characterized by a critical attitude towards:

- Public policy: Disagreement with the domestic and foreign policies of the government, protest against unfair laws, corruption and abuse of power.
- National traditions and symbols: Criticism of outdated customs, prejudices, nationalistic myths and symbols that, according to anti-patriots, do not correspond to modern values.
- The existing social order: Disagreement with social injustice, inequality, discrimination and other manifestations of oppression.
- Unconditional submission to the state: Emphasizing the priority of the rights and freedoms of the individual over the interests of the state, rejecting blind obedience and critically examining orders and instructions.

Anti-patriotism may not be just a feeling, but a worldview position. Therefore, it is important not only to explain the destructiveness of this phenomenon to society, but also to study the roots and reasons for the emergence of anti-patriotism [5, p. 144].

Candidate of Philosophical Sciences Alexander Nikolaevich Malinkin believes that anti-patriotism is "the result of a natural protest reaction of a person who is trying to break out of the established life world, but is temporarily unable to do so." Due to various personal problems and/or a low level of socialization, a person begins to feel superfluous, an outsider. The feeling of hatred towards a certain problem gradually spreads to other areas of a person's life, starting from the environment and gradually expanding to the entire Motherland.

Modern manifestations of anti-patriotism are varied and depend on the specific political context. These include:

- Critique of militarism and foreign policy: Protests against military interventions, arms races and aggressive foreign policy.
- Conscientious objection to military service: Conscientious objection to military service on moral or religious grounds.
- Supporting human rights and civil liberties: Fighting for minority rights, gender equality, freedom of speech and other civil liberties that we believe anti-patriots, are violated by the state.

- Criticism of nationalism and xenophobia: Counteracting nationalist and xenophobic sentiments, promoting tolerance and multiculturalism.
- Civil disobedience: Refusing to comply with unjust laws and participating in protests and demonstrations.
- Emigration: Moving to another country in protest against the political situation in one's own country.

But just as there is false patriotism, there is false anti-patriotism. The phrase "Only we can criticize our country" is best suited to characterize this concept, when we ourselves criticize the shortcomings of our homeland, but never allow foreigners to do so [6, p. 43].

The problem of anti-patriotism was also considered by the doctor of sociological sciences Kozyrev Gennady Ivanovich. He identified two categories of people who can be called anti-patriots. The first category includes "people of the world". Such people believe that patriotism only limits the possibilities of communication in the modern world. They are not opponents of patriotism.

The second group includes those who, for one reason or another, have hostile feelings towards their homeland. Gennady Kozyrev divides these anti-patriots into the following subgroups:

- Comprador bourgeoisie. That part of it that conducts its trading activities abroad to the detriment of the interests of its country and transfers its capital to other countries.
- Officials and deputies who, in one way or another, act contrary to national interests (including corruption), transferring their legal and illegal assets abroad, where these assets can be controlled by third parties, and government representatives lose their independence.
- Representatives of Western liberalism. They consider Western political tradition ideal and try to fully adopt it, crudely imposing it on the Russian political system. At the same time, they consider their country backward, barbaric, unworthy of their love and care.
- The fifth column is the hidden enemies of the Fatherland, working in the interests of countries hostile to Russia [4, p. 135].

Critical thinking and civic engagement are important elements of a democratic society, but the absolutization of anti-patriotic sentiments can lead to destabilization, the undermining of national identity and the weakening of the state.

Followers of anti-patriotism often distort values, replacing concepts and downplaying the importance of patriotism for the consolidation of society and the preservation of national identity. Often, criticizing individual aspects of state policy or national traditions, anti-patriots move on to denying basic values, such as love for the homeland, respect for the history and culture of their people.

Uncontrolled anti-patriotism can become a tool in the hands of external forces seeking to destabilize the country and undermine its national security. The spread

of anti-state sentiments, criticism of the army and security forces, and the denial of national interests can all weaken the state and make it vulnerable to external threats.

Patriotism is an important factor of social cohesion, uniting people around common values and goals. Anti-patriotism, on the contrary, can lead to disunity in society, increased social tension and loss of a sense of community. If everyone puts personal interests above the interests of the state and society, this will lead to anarchy and chaos.

Anti-patriots often ignore the positive achievements of their country, focusing exclusively on the negative aspects of history and modernity. This leads to the formation of a one-sided and distorted view of the homeland, deprives citizens of a sense of pride in their country and undermines their faith in the future.

Some forms of anti-patriotism can develop into extremism and radicalism, leading to violent actions and destabilization of the political situation. History knows many examples when anti-state sentiments became a justification for terrorist acts, revolutions and civil wars.

Anti-patriotic sentiments can be used for the purposes of political manipulation and propaganda. Often, anti-patriotic slogans are used to achieve selfish goals, undermine the authority of the government and destabilize society.

Often anti-patriotism boils down to criticism of the existing order without offering a constructive alternative. Denying everything and everyone, anti-patriots do not offer specific solutions to problems, do not develop positive programs and do not contribute to improving the life of society [2].

In conclusion, it is necessary to emphasize that anti-patriotism is a complex and contradictory phenomenon that has both positive and negative aspects. Critical thinking and civic engagement are necessary for the development of a democratic society, but the absolutization of anti-patriotic sentiments can lead to destabilization, the undermining of national identity and the weakening of the state. It is important to find a balance between a critical attitude towards the government and love for the homeland, between protecting the rights and freedoms of citizens and ensuring national security. Constructive dialogue between patriots and anti-patriots, based on mutual respect and the desire for the common good, is a prerequisite for building a strong and prosperous state. Anti-patriotism must not be allowed to become an instrument of destruction and chaos, but should serve as an incentive for positive changes and improving the life of society [7, p. 116-117].

Anti-patriotism is an important element of the political life of society, an expression of a critical attitude towards the government, national traditions and the existing social order. In the conditions of modern political turbulence, understanding anti-patriotism is necessary for an adequate assessment of political processes, protection of the rights and freedoms of citizens and building a democratic society.

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基于语境教学法的俄语对外教学的有效形式

**PRODUCTIVE FORMS OF TEACHING RUSSIAN AS A FOREIGN
LANGUAGE BASED ON A CONTEXTUAL APPROACH**

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摘要：本文从情境教学法的角度探讨了俄语作为外语教学最有效的形式，并介绍了列夫·托尔斯泰大学在外国学生教学过程中实施研讨会、商务活动和角色扮演游戏的经验。情境学习理论解答了如何从学习走向工作，将教育活动转化为职业实践的问题，旨在解决一项重要任务——培养学生胜任职业职能的能力。语境教学法确保了实践导向，拓展了外国学生——未来各行各业的专家——的语言和职业发展空间，从而促进了可持续的专业合作。

关键词：俄语作为外语，情境教学法，职业发展。

Abstract. *The article specifies the most productive forms of teaching Russian as a foreign language from the perspective of the contextual approach. It presents the experience of implementing seminars-discussions, business and role-playing games in the educational process of foreign students at Leo Tolstoy University. The theory of contextual learning provides an answer to the question: how to move from study to work, transform educational activity into professional, is aimed at solving an important task - developing students' abilities to competently perform professional functions. The contextual approach to language teaching ensures practical orientation, expands the possibilities of the educational space for linguistic and professional development of foreign students-future specialists in various industries in the interests of sustainable professional cooperation.*

Keywords: *Russian as a foreign language, contextual approach, professional development.*

In the Russian Federation, the current concepts [1; 3] orient the system of professional training of future specialists towards significant transformations, which are being intensively implemented in the country's universities. These changes,

firstly, actualize the value-semantic approach to the training of future professionals in the educational space; secondly, they determine the strengthening of practice-oriented approach based on the activity-based approach in teaching students. “The need for early and gradual immersion of students in the professional sphere is determined not only by the variety of tasks facing the teacher, but also by the possibility of an early start of professional activity” [2, 42]. The main tasks of modernization of education direct university teachers to search for and implement productive teaching methods that provide students with the acquisition and accumulation of diverse experience of future professional activity and professional development of the student as a future specialist.

The increase in the number of foreign students in Russian universities aims the teaching of Russian as a foreign language at expanding the target settings in training, aimed not only at the linguistic, but also professional development of foreign students - future specialists in various industries. This determines the need to ensure practical training of the future specialist at the university, his subject and social adaptation, focused on the formation of professionally significant qualities and competencies. From this position, the theory of contextual learning developed by Academician A. A. Verbitsky deserves attention.

The theory of contextual learning has significant potential for organizing the teaching of Russian as a foreign language. It involves the implementation of the following principles:

- pedagogical inclusion and personal inclusion of the student in educational activities;
- consistent modeling in the educational activities of students of the holistic content, forms and conditions of professional activity of specialists;
- problematic content of training and the process of its development;
- adequacy of the forms of organization of educational activities of students to the goals and content of education;
- the leading role of joint activities, interpersonal interaction and dialogic communication of subjects of the educational process (teacher and students, students among themselves);
- openness to the use of any pedagogical technologies proposed within the framework of other approaches;
- pedagogically sound combination of new and traditional pedagogical technologies;
- unity of training and education of the personality of a professional [4].

Contextual teaching of professionally oriented Russian language to foreign students - future specialists in various fields (management, agronomy, pharmaceuticals, sports, education) provides not only specialized knowledge and skills of professionally oriented communication, but also an understanding of the peculiar-

ities of Russian culture, statehood, social relations, norms of international business and professional communication.

However, as practice shows, the results of observations and interviews confirm the fact that the overwhelming majority of first-year foreign students do not associate the study of Russian as a foreign language with their future professional activities. And therefore, in these conditions, the increasing role of the subjective factor changes both the goals of education in general and the goals of language teaching in particular. Teaching a foreign language at a university is still focused on the implementation of practical ones - teaching communication, developmental goals that provide for the humanitarian and humanistic development of the individual, educational goals that involve expanding the linguistic, philological and general horizons, and educational goals - the meaning of which is to develop students' cognitive activity, the ability to communicate in a foreign language and to cultivate respect for another culture. In the usual formulation, this implies a comprehensive approach to solving practical, educational, developmental goals and objectives, and in essence, this is the development of a number of basic components of communicative competence.

The main strategic goal of teaching Russian as a foreign language at a university is integration. Its successful implementation is possible with the orientation of the educational process towards the personality of the student in the context of his future professional activity. We believe that forms of education based on the contextual approach offer the variety that develops motivation to master Russian as a foreign language, ensures sustainable cognitive interest, and contributes to an increase in the level of development of their communicative competence. The theory of contextual learning provides an answer to the question: how to move from study to work, transform educational activity into professional, is aimed at solving an important task - developing students' abilities to competently perform professional functions.

The aim of the work is to specify the most productive forms of contextual teaching of the Russian language to foreign students, clarifying the potential of the contextual approach in the professional development of future specialists.

Materials and methods

The research methods were traditional for pedagogical science, included the analysis of scientific and pedagogical works in the field of education; study of advanced pedagogical experience, personal practical experience of teaching Russian as a foreign language to foreign students of different specialties, observation, conversations, qualitative interpretation of the results. Practical teaching activities were carried out at Leo Tolstoy University (Tula, Russia).

Results and its discussion

The activity of a specialist in any field is mostly connected with interpersonal relations, communication skills, and not only with the presence of certain knowl-

edge. Therefore, the task of a teacher of Russian as a foreign language is to organize and actively implement joint activities in the form of seminars-discussions, business and role-playing games as the most productive forms of contextual learning, which allow foreign students to become subjects of the educational process, creators and like-minded people, and contribute to their professional development.

Teaching Russian as a foreign language to future specialists from the point of view of the theory of contextual learning is intended to:

- create conditions for students (psychological, pedagogical, technological) to master the norms of intercultural professional communication, taking into account the level of forced communicative competence;
- ensure the preparation of students at a high linguistic and subject levels with a wide range of implementation of professional opportunities;
- form professionally significant personal qualities that are socially adapted to the chosen profession.

We will specify the well-proven forms of teaching Russian as a foreign language based on the contextual approach, which are implemented at Leo Tolstoy University in classes for foreign students of various specialties.

1. Seminars-discussions as a form of contextual learning require qualified coordination on the part of the teacher of Russian as a foreign language, coordinated creative work of each student in the group, with clearly defined research tasks, forms of final presentations. Here, good organization of joint work in terms of stage-by-stage discussions, adjustment of joint and individual efforts, as well as organization of systematic external evaluation of the discussion are especially important. Before seminars-discussions the teacher introduces the students to the rules of conducting the discussion, possible roles. It is he who leads and gives the presentation plan, explains the sequence of actions for the following roles: “presenter”, “speaker”, “reviewer”, “expert”. The teacher highlights specific speech patterns and the logic of presentation, which must be used in preparing the presentation and during the discussion by all its participants.

The range of implementation of seminars-discussions is very wide, promotes interdisciplinary integration and has development potential, namely: has a positive effect on all mental functions of the individual; increases the need for knowledge of one subject (major) on the material of another (Russian language) and vice versa.

In Russian language classes on the topic “Conflicts, their causes and signs” we used tasks aimed at analyzing situations, including: situation-illustration, situation-assessment, situation-exercise. It should be noted that the disciplines “Conflictology”, “Sociology of personality”, “Pedagogy and psychology”, “Philosophy” already allow students to acquire certain theoretical knowledge and information on this topic. Therefore, in Russian language classes we offered tasks

to understanding the theoretical knowledge and developing the ability to apply it in practice, using language as a means of communication in the professional community.

The situation-illustration technique consists of analyzing drawings depicting conflict situations. Students need to describe an example of a conflict and suggest a way to it resolve.

The situation-assessment technique contains a description of the conflict situation and ways to resolve it. Students as future specialists were required to assess the effectiveness of conflict resolution. They recorded the results in writing, made diagrams and commented orally.

The situation-exercise technique is aimed at developing standard behavior in a conflict situation. We pay special attention not only to verbal communication, but also to non-verbal signs of a conflict situation. Thus, acting as representatives of various enterprises in conflict situations, students demonstrated practical skills of communicative interaction with each other and with the group [5].

As practice shows, seminars-discussions in classes on Russian as a foreign language are aimed at teaching students, firstly, to understand and evaluate future professional activity and, accordingly, to analyze their own communicative behavior. Secondly, this form of classes stimulates purposeful speech communicative interaction. Despite the fact that in classes sometimes there was a situation of mutual misunderstanding due to the limited language communicative and social experience of students, on the one hand; on the other hand, these situations became favorable models for correction, explanation, demonstration of various skills of professional activity necessary for effective communication. Therefore, the role of the teacher was to help each foreign student in their quest for success in mastering speech activity in Russian, to deeply understand and expand their understanding of communicative interaction and its importance in future professional activities.

Students participated in the seminars-discussions with great interest using the Russian language in discussing and analyzing conflict situations. Naturally, when completing the tasks, some students experienced difficulties in the logical construction of the statement, in the use of speech samples for analysis and generalization. We purposefully used such tasks, because each specialist must be able to clearly and concisely formulate thoughts, accurately determine the essence of the problem, see its root cause, substantiate their point of view. In our opinion, the students expressed themselves most frankly and interestingly using their own knowledge and experience, knowing that their opinion is respected. An important role is played by the audience's readiness to listen to the message in Russian, namely, to use speech samples to clarify the facts in the statement, concretize the idea, express agreement or objection. The main criteria for assessing the students' work were the following: activity, initiative, desire to use their own knowledge

and experience. Positive emotions of confidence in opportunities, a stable optimistic internal mood as a result of conducting such forms of contextual learning as seminars-discussions in classes on Russian as a foreign language had the due impact on the quality of learning.

2. Business and role-playing games are one of the forms of contextual teaching of Russian to future specialists. Therefore, we believe that the use of various types of business and role-playing games in teaching Russian should be considered as an important means of improving students' communicative competence.

Business and role-playing games contribute to the intensive development of intellectual skills in students, ensure the development of a culture of communication in the professional community. In conditions of separation from the language environment, targeted development and, accordingly, control over the acquisition of regional vocabulary, which reflects the phenomena of life in the country of the studied language, acquires particular importance. Thus, in classes of Russian as a foreign language, we pay special attention to the choice of topics and training materials for business and role-playing games, the problems of tasks. These materials must necessarily contain a socio-cultural context that stimulates students to think and use the necessary regional vocabulary. For this purpose, we use socio-cultural cognitive-search tasks and interdisciplinary communication-oriented games in classes aimed at developing and enriching professionally significant personal qualities of an individual, contribute to the development of the creative individuality of a future specialist in any field.

The use of business games within the contextual approach has a beneficial effect on the formation of a positive responsible attitude to future professional activity, develops professionally significant personal qualities of the future specialist. The organization and holding of business games in classes on Russian as a foreign language is based on the understanding of the game as a human activity, the subject of which are models - substitutes for objects - of other activities. Actions with labor models give rise to business games, with communication models - role-playing games.

Conclusion. Our practice shows that the implementation of productive forms of contextual learning in the process of teaching Russian as a foreign language to foreign students stimulates:

- students' acquisition of integrative cognitive and communicative skills to use the Russian language as a means of intercultural professional cooperation;
- the development of the student himself as a future specialist, as a member of a multicultural society, as an individual;
- the formation of students' abilities to competently perform professional functions.

Teaching Russian as a foreign language to future specialists based on a contextual approach ensures the study of language norms and communicative qualities of speech, promotes the development of communicative competence, forms professionally significant personal qualities of students necessary for work and cooperation in professional communities.

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高校毕业生竞争力形成问题的教育理论与实践研究现状
**THE CURRENT STATE OF THE PROBLEM OF FORMING
THE COMPETITIVENESS OF UNIVERSITY GRADUATES IN
PEDAGOGICAL THEORY AND PRACTICE**

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摘要: 本文探讨了未来专业人才竞争力发展的特征。特别关注的是“大学毕业生竞争力形成”这一概念的本质,并强调了这一现象的基本构成要素。本文认为,现代职业教育体系应注重培养学生的素质,以确保其在劳动力市场上的竞争优势。本研究旨在识别和揭示大学毕业生竞争力形成问题在教育理论和实践中的现状。研究的核心任务是明确这些素质在教育过程中形成的具体细节。

在劳动力市场转型和高等教育现代化的背景下,本文对培养毕业生竞争力的问题提出了独到的见解。本文探讨了学生在大学学习期间竞争力形成的教学方面和具体特征,包括这一过程在不断变化的经济条件下的各个阶段。本研究最后分析了在高等教育体系当前发展阶段提升毕业生竞争力的未来机遇。提升毕业生竞争力的关键在于持续学习、深化与专业环境的联系以及发展跨学科互动。这种综合的能力提升方法将为灵活应对劳动力市场的转型奠定基础,确保专业人才能够成功适应新形势。

关键词: 竞争力、高等教育机构、学生、毕业生、阶段、组成部分、劳动力市场、个性、环境、适应性。

Abstract. *This paper examines the features of the development of competitiveness among future professionals. Special attention is paid to defining the essence of the concept of “formation of competitiveness of a university graduate”, as well as highlighting the fundamental components of this phenomenon. The work focuses on the fact that the modern system of professional training should focus on the development of students’ qualities that ensure their competitive advantages in the labor market. The purpose of the research is to identify and disclose the current state of the problem of forming the competitiveness of university graduates in pedagogical theory and practice. The central task of the research is to identify the specifics of the formation of these qualities in the educational process.*

In the context of the transformation processes in the labor market and the modernization of higher education, an original vision of the problem of developing the competitive advantages of graduates is presented. The pedagogical aspects and specific features of the formation of students' competitiveness during their studies at the university are considered, including the successive phases of this process in changing economic conditions. The study concludes with an analysis of future opportunities to increase the competitiveness of graduates at the current stage of the evolution of the higher education system. Improving the competitiveness of graduates is seen in constant learning, deepening ties with their professional environment and developing interdisciplinary interaction. Such an integrated approach to competence improvement will create the basis for a flexible response to the transformation of the labor market, ensuring the successful adaptation of specialists to new conditions.

Keywords: competitiveness, higher education institution, student, graduate, stage, component, labor market, personality, environment, adaptability.

Modern trends in the development of society and the educational sphere, including globalization processes, the variability of the socio-economic situation, the digitalization of youth life, as well as the development of an open education system and advanced training, emphasize the importance of the issue under consideration. The importance of the topic is reinforced by the fact that university graduates, young professionals, demonstrate insufficient adaptability to the dynamically changing conditions of the modern labor market. In addition, the observed transformation of the labor market is accompanied by an increase in employers' demands on employees, which significantly complicates the process of employment of graduates of higher educational institutions. These factors together determine the high relevance of the topic under study. Modern higher education is facing a challenge: how to harmoniously combine the development of a person as a cultural subject with the formation of his professional knowledge and competencies.

Currently, the educational process should be focused on the real needs of the labor market, and not exist in isolation from practice. To train a competitive specialist, it is necessary to bridge the gap between fundamental disciplines and practical professional training. An effective solution to this can be the introduction of organizational and pedagogical measures aimed at developing students' systemic and integral thinking. At the same time, it is important to optimize the educational content, reducing its volume, but maintaining the high quality of the acquired knowledge [11].

In her research, N.G. Nikolaeva examined the process of forming the competitiveness of university graduates and noted that the goals of the teaching staff in

the formation and development of competitiveness of a teenager at the stage of his studies at the university are to achieve a high level of education, desire and willingness to act productively and creatively professionally and personally, as well as awareness of the importance of personal self-improvement [8, p. 233].

The study by Myagkova V.Yu. and co-authors highlights the theoretical aspects of the formation of competitiveness of future specialists, notes that the main thing in this process is to take into account its components. The authors emphasize the importance of integrating various components of a communication strategy into the training of future professionals. Active and competitive participation in the labor market, as well as successful career building, become possible through the enrichment of professional and personal competencies. To achieve these goals, it is necessary to take into account the interrelation of the components of the communication strategy with the requirements of the state standard, take into account the features of professionally oriented interaction and necessarily introduce various elements of cognition [6, p. 225].

The scientists, led by E.A. Avetisyan, identified the key components contributing to the formation of university graduates' competitiveness in the labor market: emotional stability with a developed volitional sphere and an objective assessment of their own capabilities; non-standard thinking and intellectual adaptability; early immersion in the professional environment and the ability to analyze professional activities; developed self-understanding with a high level of autonomy and self-realization; the ability to identify set goals that are meaningful to the individual and set priorities. Striving for professional excellence and a conscious choice of a career path characterize a person who actively forms his own education. Such a person is distinguished by a clear understanding of his goals and objectives, and a sincere interest in obtaining high-quality knowledge. Reflexive ability is a distinctive feature of an individual with a subjective position. It is extremely important for a future graduate to develop subjectivity — the ability to strategically plan activities, set and adapt goals, and deeply understand their motives [1, p. 84].

In the research conducted by S.A. Dneprov and colleagues, special attention was paid to the corporate aspect of the formation of the competitiveness of university graduates, which is characterized by the willingness of an individual to temporarily put collective interests above personal interests in order to achieve better results in the future. This problem is partly due to the limitations of existing training formats, whether it is training sessions in educational institutions or corporate events in the field of management, such as industrial meetings and professional development programs [3].

In their monograph, Vlasyuk I. V. and co-authors emphasized the key characteristics of a competitive personality. In their opinion, such people have developed critical thinking and high professional competence. They are able to effectively

build social connections, demonstrating communication skills and networking skills. A competitive personality, according to researchers, is characterized by a conscious value system and clearly formulated goals. She shows a creative approach to completing tasks, diligence and a focus on achieving success. Resistance to stressful situations and the ability to adequately self-assess are also important qualities. Such people have the skills to plan their future and understand how to achieve their goals, and they constantly strive for intellectual enrichment and comprehensive development in all spheres of life. Based on this study, the formation of students' competitiveness includes three interacting elements: the cognitive aspect, the emotional component, and the activity-motivational component [2, p. 23].

In her research, A. F. Kazakova studied how different generations of people involved in the modern educational process, in which representatives of different age groups (teacher-student) demonstrate dissimilar life priorities and motivational attitudes. When providing psychological and pedagogical support and organizing the formation of competitive qualities among students, it is important to take into account the specific features of different generations [5].

Thus, one of the essential features of the concept of "competitiveness of university students" is related to the fact that this phenomenon does not reflect a separate property or quality of personality, but represents a certain socially and professionally significant set of personal characteristics, which is formed under the influence of internal and external factors.

According to research by Fezzey T. As with colleagues, the process of forming the competitiveness of university graduates depends on personal parameters that encompass elements that are traditionally associated with rivalry and the desire to surpass others [12].

Investigating the theoretical and practical aspects of the formation of the competitiveness of university graduates, Wood T. and co-authors found that competition has a significant impact on society, but the application of scientific knowledge in this area remains problematic. The authors emphasize that, despite extensive theoretical developments, the practical implementation of knowledge about the competitiveness of university graduates, including methods of its regulation and mitigation, remains extremely limited in practice. An adversarial approach can promote career growth and competitiveness among students and aspiring employees, but at the same time increases stress levels and reduces psychological well-being. It is necessary to apply a situational approach to competitive strategies, carefully choosing the moments and ways to use competitive methods. It is necessary to direct the upcoming scientific research to study the real effects of the competitive environment [13].

According to the observations of Y.J. Zoller and co-authors, the increased interest in the formation of competitiveness of university graduates has contributed

to the emergence of a variety of theoretical innovations and contradictory empirical results. These studies are scattered across various scientific fields, including economics, psychology, business, and other disciplines. It is critically important for researchers of organizational science to understand the evolution of this field, its current state and development prospects. Despite the fact that the expansion of the research field is necessary for the development of the topic, the multiplicity of definitions and methodological tools creates serious obstacles to a holistic understanding of the concept of competitiveness, making it difficult to identify its prerequisites and consequences [14].

Ivanov S.Yu. and co-authors in practice determined the factors influencing the formation of the competitiveness of university graduates: the quality of graduate training; orientation to the needs of society, the economy, the requirements of a particular employer. Institutions of higher education, ensuring the quality of education, must meet the needs of the state, employers, students, social groups, subsystems of society and society as a whole. It is known that the chances of a young specialist finding a decent job increase if a number of personal qualities and properties are added to professional competencies that ensure successful professional adaptation within the requirements of the workplace [4, p. 74].

According to a group of scientists led by S.N. Yaroshenko, professional training is the most appropriate context for the formation of competitiveness of future graduates, which is implied by the formation of personality. Researchers note that it is the concept of students' CS formation that most accurately reflects both the complex influence of various factors and the final achieved level of this quality among students [9; 10, p. 16].

Myagkova V.Yu. and co-authors conducted an empirical study, which made it possible to identify three stages of the formation of graduates' competitiveness: motivational-stimulating, formative, activity-evaluative [7, pp. 76-77].

A theoretical understanding of the existing concepts confirms the need to integrate professionally significant personality traits with specific competencies in the educational process. Among these competencies, the following are of particular importance: cognitive, special, social, communicative and socio-informative components of students' professional training.

In the course of the study, we came to the conclusion that the competitiveness of a university graduate is determined by his ability to successfully adapt and function in a professional environment, which implies both deep academic knowledge and practical skills. The pedagogical essence of this problem is to create a learning system that promotes the development of the following components:

1. Professional competencies. Possess the necessary knowledge and skills specific to the chosen profession.
2. Flexible skills. Creativity, critical thinking, communication skills, adaptability and cooperation.

3. Digital literacy. The ability to work with modern technologies and tools necessary for the successful performance of professional functions.

4. Social responsibility and ethics. Understanding the role of their professional activities in society, ethical principles of doing business.

The modern labor market, characterized by high volatility and constantly changing requirements, dictates the need for a fundamental revision of educational strategies of universities. An analysis of the state of the problem of forming the competitiveness of university graduates allowed us to identify its features in the context of the renewal of higher education and the transformation of the modern labor market.:

-updating the approaches to the university's interaction with the business community. The creation of an ecosystem of cooperation between universities and commercial structures is one of the decisive factors in the formation of relevant competencies among students. Involving industry representatives in the development of educational programs allows you to synchronize educational content with the current needs of the market. The organization of long-term production practices and targeted internships ensures that students are immersed in a real professional environment even at the stage of education. Joint research projects are of particular value, where students solve specific business problems under the guidance of both academic mentors and industry experts. This symbiosis of theory and practice significantly increases the adaptability of graduates to rapidly changing professional conditions.;

-personalization of educational trajectories of university students. Moving away from unified study programs in favor of flexible individual routes represents a revolutionary step in modernizing higher education. The formation of personalized curricula that take into account the cognitive characteristics, career aspirations and potential of each student contributes to the maximum realization of their professional opportunities.

-diversification of technologies and methods of the educational process of the university. The transition from passive perception of information to active knowledge construction requires the introduction of a wide range of interactive educational technologies. The gamification of the educational process, the use of virtual and augmented reality, the organization of hackathons and professional competitions are transforming the traditional educational paradigm.

-digital transformation of the university's educational environment. In the modern world, education is undergoing drastic changes under the influence of technological progress. The integration of innovative digital solutions into the educational process is becoming not only desirable, but a necessary strategy for educational institutions at all levels. Traditional teaching methods are gradually giving way to interactive approaches based on the use of a variety of electronic resources. Educators and students are increasingly turning to virtual educational ecosystems

that offer flexible opportunities for personalized learning. This increases the quality of graduates and helps them adapt to the new labor market conditions.

The formation of competitiveness requires universities to constantly update curricula, introduce new formats and teaching methods. In the context of the transformation of the labor market, the demand for graduates will depend on their ability to adapt to new professional challenges, which requires sustainable development of competencies throughout the entire period of study. The prospects for the development of graduates' competitiveness are linked to the strengthening of an interdisciplinary approach, closer integration with the professional environment and an emphasis on continuing education, which will allow graduates to successfully adapt to future changes in the labor market. The scientific novelty of the results and ideas presented in the article lays the foundation for more effective cooperation between universities and employers and social partners. The changing socio-economic situation requires a new approach to student preparation. In the context of the transformation of the modern labor market, graduates need to develop their competitive personal and professional qualities, which will greatly contribute to solving the problem of their employment in the labor market.

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法律能力的形成：基于活动的方法和基于系统活动的方法
**FORMATION OF LEGAL COMPETENCE:
ACTIVITY-BASED AND SYSTEM-ACTIVITY-BASED
APPROACHES**

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注释。本文探讨了法律规制在教育领域的现实意义以及教师法律能力在现代条件下的作用。尤其关注法律能力的培养，将其作为教师职业再培训的重要方面，以确保教育过程的安全性和有效性，并尊重教育关系中所有参与者的权利。本文分析了白俄罗斯共和国教师职业活动的立法框架和监管要求。本文描述了培养法律能力的现代方法，包括基于活动的方法、系统活动方法、案例技术和以能力为导向的任务，这些方法有助于培养将法律知识应用于教学实践的实践能力。本文强调将法律能力融入教学活动对于提高教育质量和培养能够有效驾驭法律空间的公民的重要性。

关键词：法律能力、教师、职业再培训、基于活动的方法、系统活动方法、案例技术、以能力为导向的任务。

Annotation. *The article considers the relevance of legal regulation in the field of education and the role of legal competence of teaching staff in modern conditions. Particular attention is paid to the formation of legal competence as an important aspect of professional retraining of teachers, ensuring the safety and effectiveness of the educational process, as well as respect for the rights of all participants in educational relations. The legislative framework and regulatory requirements governing the professional activities of teachers in the Republic of Belarus are analyzed. Modern methods of forming legal competence are described, including an activity-based approach, a system-activity approach, case technologies and competence-oriented tasks that contribute to the development of practical skills in applying legal knowledge in pedagogical practice. The importance of integrating legal competence into pedagogical activity is emphasized to improve the quality of education and upbringing of citizens who are able to effectively navigate the legal space.*

Keywords: *legal competence, teaching staff, professional retraining, activity-based approach, system-activity approach, case technologies, competence-oriented tasks.*

Legal regulation in the field of education is becoming increasingly relevant in modern society. In the context of a dynamically changing legislative field and increasing requirements for the qualifications of teaching staff, the training of specialists who are able to effectively use legal knowledge in their professional activities is of particular importance. Legal competence of a teaching staff member is one of the most important aspects of professional retraining. In the context of modern society, knowledge of legislation and the ability to apply it in practice ensures the safety and effectiveness of the educational process, as well as the observance of the rights of all participants in educational relations.

The need to consider legal competence is dictated by the task of developing the professional competence of a teacher who respects the laws and is able not only to use legal knowledge in his/her activities, but also to apply it in accordance with the Concept for the Development of the Education System of the Republic of Belarus until 2030 [1], State program “Education and youth policy” for 2021-2025 [2], the Concept of the National Strategy for Sustainable Development of the Republic of Belarus for the period up to 2035 [3].

The requirements governing the implementation of professional activities by teaching staff based on the implementation of regulatory legal support are enshrined in legislative acts: the Code of the Republic of Belarus on Education (2022); in the qualification requirements for the positions of specialists employed in education; provided for by the Unified Qualification Handbook of Employee Positions (EQHR) employed in education (issue 28), approved by the Resolution of the Ministry of Labor and Social Protection of the Republic of Belarus dated July 29, 2020 No. 69, etc. In accordance with Article 53 of the Code of the Republic of Belarus on Education, teaching staff are obliged to carry out their activities at a professional level that ensures the implementation of educational programs, upbringing programs; comply with legal, moral and ethical standards; respect the honor and dignity of students and other participants in the educational process, etc. [4, p. 49].

The importance of legal competence in the professional activities of a teaching staff member lies in ensuring the legal protection of the educational process, preventing legal conflicts, complying with the regulatory requirements of the law, as well as developing the legal awareness of students and creating conditions for their safe and harmonious development in the educational environment. A teacher with high legal competence knows how to navigate regulatory documents, correctly respond to legal situations, prevent conflicts and ensure the observance of the rights of children, colleagues and parents. This helps to create a favorable atmosphere in the educational environment and increases the authority of the teacher.

The solution to this issue is realistic in the context of retraining students in pedagogical specialties when studying the fundamentals of educational law, revealing

the general characteristics of educational law, the legal foundations of state educational policy, legal relations in education, disciplinary responsibility, etc.

Modern approaches and technologies for developing the legal competence of a teaching staff member include: the use of practice-oriented teaching methods, such as case technologies, i.e. activities based on solving specific professional problems, as well as competence-oriented tasks that can help not only to learn regulatory requirements, but also to learn how to apply them in real teaching situations, which contributes to an increase in legal culture and professional confidence.

“The activity approach is an understanding of learning as a process of the student’s educational activity, during which his consciousness and personality are formed” [5, p. 13]. The activity-based approach involves active participation of students in the learning process through practical activities: solving cases, role-playing games, modeling situations, business discussions. This method helps to develop practical skills necessary for the professional activity of a teacher.

“The activity-based approach, in which the pedagogical toolkit is built on the basis of the theory of activity (i.e. knowledge about activity at a higher level of abstraction), began to be called the system-activity approach (the term was introduced by A.G. Asmolov in the mid-1970s). The advantage of the system-activity approach over the activity-based approach is the non-random nature of the management of the student’s educational activity, the presence of a common criteria base for all, necessary for the creation of control tools and certification procedures, the reliability of the obtained conclusions and results, the ability to identify what is common in various educational systems and, on this basis, systematize the accumulated pedagogical knowledge and practical experience of activity-based learning” [5, p. 14].

The development of legal competence in students undergoing retraining in pedagogical specialties based on a systemic-activity approach can create conditions for the formation of a sustainable and developing understanding of legal norms and their role in pedagogical practice, as well as skills for the effective application of legislative requirements.

The use of case technologies in the development of legal competence allows one to model real situations, analyze legal aspects of specific conflict or complex cases, develop skills in the practical application of legislation, and also develop their ability to make balanced and well-founded decisions in professional activities.

In the large explanatory dictionary of the Russian language, “case” is -a; m. (English case) – a flat suitcase for carrying papers, notebooks, books; a diplomat [6]. Case (from the English case - bag, briefcase) - a set of educational materials on different media (printed, as well as audio, video, electronic), given to the student for independent work [7]. Translated from English, “case” is understood as “oc-

casion”, “business”, “portfolio”, “box”, that is, a case is a description of a specific situation or event in any area. As a rule, a case contains not just a description, but also a certain problem or contradiction and is based on real or close to them facts. Accordingly, to solve a case means to analyze the proposed situation and find the optimal solution.

Therefore, by pedagogical legal cases we mean artificially modeled or reproduced real pedagogical situations that a teacher encounters in his practice, requiring decision-making within the framework of legal knowledge and ethics, which makes training more lively and practice-oriented. Consideration of specific cases can contribute to the development of analytical skills, the ability to find legal solutions and correctly respond to legal challenges. For example, analysis of a situation of conflict with parents or violation of the rights of a student will allow not only to understand the norms of the law, but also to learn how to effectively apply them in specific situations.

The use of competence-oriented tasks helps students develop skills for independent analysis, decision-making and application of legal knowledge. Tasks of this kind require not only memorization of regulations, but also their interpretation, search for optimal solutions in professional activities. For example, an assignment may include developing a recommendation for solving a specific problem in educational activities.

The importance of developing legal competence for a teacher is key to ensuring effective professional activity and harmonious development of the educational process. For a modern teacher, possession of legal competence is a critical factor. This ensures not only the fulfillment of professional duties, but also the protection of the rights of subjects of the educational process. In addition, the legal competence of a teacher contributes to the formation of respect for the law and legal values in students, which is important for their socialization and the development of civic responsibility.

Thus, the formation of legal competence of a teacher is an integral condition for improving the quality of education and upbringing of responsible citizens who are able to effectively navigate the modern legal space. Based on the above, it can be assumed that with modern teaching methods, such as case technologies and competence-oriented tasks based on a system-activity approach, can influence the effectiveness of the formation of legal competence of students undergoing retraining in pedagogical specialties. This is especially important in the context of a dynamically changing legal field and increasing requirements for the professional activities of teachers. With a high level of legal competence, a teacher becomes not only a bearer of knowledge, but also an active participant in the formation of the legal space in the educational sphere.

Integration into pedagogical practice of not legal knowledge, but legal competence, formed through teaching theoretical aspects together with practical classes

and case methods and supported by a system of control and assessment, is a necessary step towards the development of the education system in the modern world. Such an approach is capable of forming a specialist with new qualities, inclined to professional self-realization and sustainable progressive development in modern conditions that require flexible adaptation mechanisms in solving professional problems, taking into account the formed base of legal knowledge and algorithms for making legal decisions.

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新社会经济条件下技校学生跨文化科学交流能力培养

**CROSS-CULTURAL SCIENTIFIC COMMUNICATION TRAINING
OF TECHNICAL STUDENTS IN NEW SOCIAL AND ECONOMIC
CONDITIONS**

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摘要：高等教育机构的国际化发展要求创新职业培训方法和技术。本文探讨了在新的社会经济条件下跨文化科学交流的本质问题。作者界定了跨文化科学交流的概念，并确定了其本质和构成要素。文章介绍了新西伯利亚国立建筑工程大学工程专业学生在跨文化交流方面的社会和职业培训条件，以及在新西伯利亚两所大学开展的实验。此外，还分析了学生参与各种国际活动和获得科学交流能力的教育条件。

关键词：跨文化交流、科学交流、技术学生、社会经济条件、职业交流能力、国际高等教育、教学条件。

Abstract. *The international development of institutions of higher education requires innovative methods and techniques of professional training. The paper addresses the issue of the nature of cross-cultural scientific communication in new social and economic conditions. The author identifies the concept of cross-cultural scientific communication, determining its essence and components. The article describes the social and professional training conditions of engineering students through cross-cultural communication at Novosibirsk State University of Architecture and Civil Engineering and the experiment held at two universities in Novosibirsk. The educational conditions for students' participation in various international events and acquisition of scientific communicative competence are analyzed.*

Keywords: *cross-cultural communication, scientific communication, technical students, social and economic conditions, professional communication competence, international higher education, pedagogical conditions.*

Introduction

Internationalization and globalization have become an integral part of our society and continue to gain importance. Our contact with people from different cultures, whether at work, higher education institutions or in everyday life, is steadily increasing. Changes in social and economic conditions in the modern world lead to changes in the role of education in society, lead to the development of innovation processes in the educational system and propose how to apply these innovations. An important area in educational development is the multi-level training system; the implementation of this system is associated with the development of educational levels of higher education institutions.

The most important goal of professional training is to form a competent specialist with a set of universal, general and professional skills in accordance with the requirements of FSES 3++. The technical skills that employers require are called super-professional skills, with the ability to work in teams, set precise goals and achieve them; and the ability to work in a multicultural environment [1, 2].

The aim of the university programmes is to train not just the specialists, but the employees who are able to interact with each other in the process of communication. The students must be ready and able to communicate with the participants of different scientific and professional activities.

Thus, language is considered an essential tool for transmitting knowledge, values, and professional experiences. Though the communication is influenced by the interaction between situational and sociocultural conditions, it follows certain culturally specific rules (e.g., choice of topic, communication style, social or gender-role of the speaker, etc.), to which members of a culture are accustomed, belonging due to their social integration in that culture [3].

Therefore, cross-cultural training of technical students seems a vital issue for analysis.

Methods

The analysis of the literature and the works of many authors make it possible to identify contradictions that require their resolutions at the social and pedagogical, scientific and theoretical, scientific and methodological levels.

The following contradictions were revealed:

- between the need of the country, society and higher education for young scientists capable to interact on scientific issues with representatives of other cultures and the insufficient development of theoretical and methodological foundations for graduate and postgraduate students training at technical scientific specialties at

universities for cross-cultural scientific communication in conditions of growing scientific and technical progress;

- the high importance of cross-cultural scientific communication to form the research activities of graduate and post graduate students and the lack of the model to form the research competence of graduate and post graduate students of technical specialties in the process of cross-cultural scientific communication training;

- between the need to modernize the process of training graduate and postgraduate students at technical universities with the integration of special and humanitarian disciplines and the insufficient development of pedagogical tools to train graduate and postgraduate students of a technical specialty for cross-cultural scientific communication.

In this regard, the problem of ensuring the quality of the educational process at graduate and postgraduate levels of the higher education, focused on the training of specialists who are not only highly qualified, but also who are able to participate in international conferences, conduct online debates and participate in master classes, i.e. capable to communicate in the scientific community

Results and discussion

Communication can be understood as ‘the process of transmitting information from one person to another’, from the sender to the receiver. Cross-cultural communication occurs when people from different cultures communicate with one another. The term ‘cross-cultural’ (or ‘intercultural’ in some resources the authors use these two terms interchangeably) communication means ‘transactional, symbolic process involving the attribution of meaning between people of different cultures each other’ that takes place on international grounds.

In an organisational environment, there is a wide variety of different forms of communication to choose from. The researches discuss the following:

- verbal and non-verbal,
- formal and informal,
- oral and written,
- horizontal and vertical communication [4].

Verbal communication is a communication exchange based on words while, according to some studies, words account just for 7 percent of the message content. The rest, i.e. 93 percent of the content, comes from non-verbal communication. This exchange does not use words, or even if uses them, they can have more than one common meaning. As it has been mentioned earlier, language is communicated in a particular context. Low-context cultures base their communication on explicit verbal codes, whereas high-context cultures communicate much more by the context of its non-verbal form .

In our research work under ‘cross-cultural communication’ we understand communication between representatives of different cultures: national, religious,

family, professional and social [5]. It can be verbal and non-verbal and can include the use of words, gestures, eye contact, or body language when interacting cross-culturally.

The students of NSUACE (Sibstrin) are being trained to be ready for cross-cultural scientific communication as the international events and conferences are held at the university. The number of students' participation in the conferences, and as the results, their publication activities both in Russian and foreign languages (English, Russian as a foreign language) are shown in Table 1. The results are presented for the period from 2022 to 2024. Most English-language publications focus on key areas such as: architecture, engineering, ecology and computer technology [6,7].

Table 1.
Publication activities of the students (2022-2024)

Year	Number of participants	Articles (RSCI ¹)	Articles (HAC ²)	Articles (Scopus/WoS)
2022/2023	500	375	44	6
2023	522	603	117	15
2024	870	605	61	18 (Scopus), 13 (WoS)

¹RSCI – Russian Science Citation Index

²HAC – Higher Attestation Commission

The university actively develops international cooperation, supporting 30 existing agreements with scientific and educational organizations of Armenia, Belarus, Bosnia and Herzegovina, Iran, Kazakhstan, China, Kyrgyzstan, Serbia, Tajikistan, Turkey and Uzbekistan. Particularly close cooperation has been established with five universities of Belarus: joint scientific projects are being implemented, internships and conferences are being held, and the Center for Technosphere Safety, Environmental Technologies and Water Use (UNESCO) has been established. In 2023, undergraduates of the Department of International Affairs completed a scientific and practical internship in Mongolia.

Conclusion

Cross cultural scientific communication in students' social and professional training is a long-term, phased, sequential and progressive process, taking place in an integrated communication environment with industrial and decisive characteristics. determine the integrative nature of students' personalities for language interaction. of intercultural communication.

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教学博客评论的话语特征

DISCOURSE CHARACTERISTICS OF COMMENTARIES TO
PEDAGOGICAL WEBLOGS

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摘要: 本文探讨了网络博客、混合体裁的教学博客以及媒体对记者教学博客的评论(作者:《华盛顿邮报》的瓦妮莎·施特劳斯)所面临的问题。文中指出,媒体对教学博客的评论具有以下特点:专业性强、忠实于博客语言的作者和读者、逻辑论证严谨、语言结构复杂、术语和非正式词汇单位的混合、以及文体手法的多样性。

关键词: 网络博客、教学话语、教学博客、媒体评论。

Abstract. *The article exposes the problems of weblogs, pedagogical blogs as a hybrid genre and media commentaries to the journalist's pedagogical blog by Vanessa Strauss from the newspaper «Washington Post». It's stated that media commentaries to pedagogical blog are characterized by professionalism, loyalty to the author and readers of the blog language, logical argumentation, complexity of linguistic structures, mixture of terminology and informal lexical units, variability of stylistic devices.*

Keywords: *weblog, pedagogical discourse, pedagogical blog, media commentary.*

Pedagogical weblogs may be considered a hybrid genre in which the features of pedagogical discourse and media discourse are mixed, and, as a result, their characteristics are determined by the specific features of both types of discourses. An academic blog is a subtype of a weblog as a whole, and the last in research acquires both quite broad and narrow interpretations. The researchers vary the understanding of a weblog from a means of communication through the transmission of written messages [1], asynchronous interpersonal or group computer-mediated communication [2, p. 365] to a website, a web page, an online diary created to inform on a specific topic, which may contain personal impressions that are open for reading and commenting [3, 4]. More general view is formed as a such one: weblogs are streams of journal-like material in various web-based formats that

provide hyperlinks to other web materials where their developers' ("bloggers") produce personal reflections and critiques [5, 6].

It's evident that a weblog is an internet communication phenomenon so it is characterized by such markers as mediation by computer and internet technologies, hypertextuality, immediacy or asynchrony of communication, interactivity, multimedia, preservation of commentators' anonymity. A weblog is a frequent, publication with reverse chronological order its main component being dated and titled post. There is also the comments' section where the weblogger's opinions may be discussed and debated.

Weblogs are considered by some researchers an example of the appropriation of generic resources from previously established genres to form a more dynamic and innovative form, motivated by new technology and social need [6, 7, 8]. V. Bhatia has called this appropriation of generic resources as the «invasion of territorial integrity» and claims that nowadays it is difficult to maintain individual generic boundaries intact, particularly because of the explosion of information technology [8, p. 87-88].

J. Walker contributing to the «Routledge Encyclopedia of Narrative Theory» notes that most blogs primarily textual but others classified into subgenres such as photoblogs, videoblogs, and audioblogs [9]. R. Blood distinguishes three basic types of weblogs: filters, personal journals, and notebooks. The content of filters is external to the blogger (world events, online happenings, etc.), while the content of personal journals concerns the blogger's thoughts and internal mentality; notebooks may contain either external or internal content, and are distinguished by longer, focused essays [10].

The fact that blog belongs to pedagogical discourse is determined by the blog's contents – a broad or narrow focus on learning problems, the organization of the educational process, monitoring and evaluation of educational matters etc. The blog's addressees are researchers, teachers and educators from various educational institutions, journalists specializing in pedagogical topics and covering acute issues of education, the educational system and pedagogical technologies. The specifics of the media discourse are also reflected in the pedagogical blog, because its important component proves to be targeting to the reader-commentator, which dictates the features of the blog characteristic of media discourse, namely wide use of linguistic means, pronounced authorization, dialogism, lack of space and time constraints and the equal status of communicants. The recipients of the pedagogical blog are people interested in improving the educational process, and these are, first of all, teachers, school administrators, college supervisors and tutors, university professors, as well as students.

On the base of these features of the blog, it is possible to define a pedagogical blog. A pedagogical blog is a communicative online platform (website or

web page), united by educational topics, where representatives of the academic community (teachers, teachers of schools, colleges, higher schools, researchers) can express their opinions on a particular problem of the learning process. Structurally, a pedagogical blog, like other blogs, opens with entries that are arranged in reverse chronological order; the author of the blog usually has a certain status in the educational or media community and uses his own photo for identification; the blog provides hyperlinks to articles by the author and other researchers and bloggers that are relevant to the issues being discussed and useful for discussion.

Pedagogical blogs may be classified into four general categories and can be considered to form a subset of genres within the larger system of academic and educational genres, which are intertextually and interdiscursively linked within the boundaries of academic and educational activity. The genre subset proposed by K. Stuart consists of the following: PhD weblogs (research diaries); student weblogs (coursework); educational weblogs (class weblogs); academic weblogs (research work) [6, p. 392]. But due to the fact that many blogs operate in the media system of newspapers or media magazines we may add to this classification journalists' pedagogical blogs which are also characterized by professional approach to educational issues thus tending to the class of academic blogs, by openness in the Internet space and subject to comments, becoming a media fact.

Comments on blog posts acquire the status of a media commentary. Media commentary, is a complex polysemiotic structure of evaluative and interpretative nature, functioning in the media environment and possessing interactive discursivity, subjectivity of the manifestation of linguistic personality in terms of content, composition and stylistics [11].

To identify some of the features characteristic of media commentary to the pedagogical blog, let us consider the entry in the Washington Post educational blog «Answer Sheet» by the regular author Valerie Strauss «Rethinking the way teachers assign student grades» dated November 14, 2023 [12]. This post is devoted to the assessment system in elementary and secondary schools in the United States concerning the following questions:

- what the meaning of unsatisfactory mark is;
- if the traditional 100-point scale from A to F (A, B, C, D, F) makes sense;
- if using the 50-point system proposed by Rick Wormeli [13] is more appropriate and effective as it assumes a score of zero for non-completion of the assignment and advocates for a transparent and personalized assessment system that reflects the true understanding of the material by the student rather than his ability to complete the task;
- in which way unsatisfactory marks or zero assessment influence on students' self-esteem.

45 commentaries have been received to this article that discuss the raised issues in various aspects. Some authors support the traditional 100-point scoring sys-

tem with grades A,B,C,D,F (fail), sometimes criticizing R. Wormeli's approach: **Show me the Data:** I have no trouble using a 100-point scale; **With respect:** The traditional grading system using a curve or a modified curve works just fine.

Others sharply criticize it, sometimes supporting Wormeli, but more often they do not pay attention to his system: **Pmichaelsartist-at-large:** I hate to see Student learning boiled down to 4 or 5 letter grades; **Whine Merchant:** the 100-point scale is an ineffective and disturbing way to help students navigate the gantlet of extreme stressors in their young lives, many of which are beyond their control; **Asdf4:** ... the solution is better than what we have, now, though probably still has issues.

A lot of bloggers-commentators call for flexible use of the assessment system's capabilities: **MsEvenstar:** Abandon letter grades altogether... use 100 pt scale with (where needed) relative percentages allocated to the different elements of the task/skill being tested. Some deny the efficiency of assessment by any marks: **Approximationofreality:** Grades are silly... Homework should not be graded.

Practically all respondents agree that students should be taught how to learn, how to use data, and should be evaluated after they've got complete information on the topic and understand it, as well as that the assessment should be fairly objective.

Some of the blog's readers judge the approach in the article to the raised problem is not adequate enough and reflect the situation in a wrong way as it represented in a following media commentary: **dave:** Wow. I hardly know where to start. Thus opinion displays a fundamental lack of understanding of statistics by the author. A grade of zero for an assignment not turned in is not an outlier, it is an accurate assessment of performance on that task. The overall effect on a total grade is almost always conditioned by a weighting factor that accounts for the importance of that task relative to the body of work expected In the class. This sort of sloppy thinking is why we have a failing education system.

Though this opinion is critical and even hush the author uses euphemistic constructions so that it seems more respectful to the addressee.

The language of media commentators to the pedagogical blog is certainly professional, they demonstrate fluent abstract vocabulary (*self-esteem, emphasis, accolade, challenge, set-back, failure, controversy, deduction, determination, accountability* etc.), use complex grammatical and syntactic structures (*penalize the grade for unjustified lateness, which is what I do; It actually undermines their perceived control since their grades are not contingent on their actual behavior, It remains a verbal slight-of-hand to decouple the student's grade from the method we use to demonstrate if they have learned anything; The pretend-they-earned-a-fifty argument has been facilitating resistance and underachievement for a decade already*), vivid imaginative epithets (*rigorous assessment; atrocious writing; blind*

equality; a strong internal locus of control; accurately communicated, summative judgments).

Many of the commentaries contain arguments, as well as practical examples, and in some commentaries there are included facts about the respondents' personal lives, the lives of their children, or their students. Many of the commentaries appear being written in a journalistic style, with an abundance of phraseological units, rhetorical questions, arguments, metaphors, antitheses, and parallel constructions. All these devices are present in the following media commentary: **Malcolm Kirpatrick:** Why do schools grade students at all? Why cannot school work like the multiplex theater, the library, or the gym: watch what you want, read what you want, lift what you want? Safeway doesn't grade customers on culinary ability. 24 Hour Fitness doesn't grade members on how much they can bench. The State (i.e., government, generally) cannot subsidize education without an operational definition of "education". The State cannot compel attendance at school without operational definitions of "attendance" and "school". The State cannot employ teachers without an operational definition of "teacher". We grade students to prove that we're doing our jobs. Schools grade students because they receive taxpayer money and assemble their clientele at gunpoint. Grading arouses controversy because (a) school has a racially disparate impact and (b) school has become a make-work program for dues-paying members of the NEA/AFT/ASCME cartel.

In general, virtual communication in the media commentaries to the pedagogical blog entry is distinguished by literacy, vocabulary, normative spelling and punctuation, although it tends to informal communication, as it contains informal greetings and addresses, slang expressions, abbreviations, emphatic statements, colloquial cliches, etc.: for example **Viv Barker:** ... *I remember back in freshman yr of college (eons ago)...*; **Pmichaelsartist-at-large:** Well, *that was clear as mud*; I am tired, but still.... I'm thinking that Chemistry and Physics *come pretty close on the heels* of Math subjects. **okfalcon2:** ... *What a shame*; there's *so much of a mess* now that teaching and learning are hardly possible. **Aproximationofreality:** *Sorry to rant*, but not too sorry

Obviously, all those commentaries demonstrate the variability of opinions in academic circles and outside them concerning urgent educational problems, the participants' wish to freely produce their own views on the problem suggesting the ways to solve some issues and giving practical advice in interactive form that is appropriate in the genre of a weblog. Each of the blog's commentators chooses its own way of self-representation in linguistic sphere being either logical and argumentative or emotional or combining these options; either more formal or more colloquial thus creating unique discursive pattern of weblog reactive communication.

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“盛宴”概念的塑造：语言文化与翻译视角
MODELING THE CONCEPT OF ‘FEAST’: LINGUOCULTURAL
AND TRANSLATION PERSPECTIVES

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摘要：本文探讨了盎格鲁-撒克逊文化 (symbol) 和俄罗斯文化 (pir) 中盛宴的概念建模和语言文化层面，突出了两者的共同特征和独特之处。研究识别了关键的微观概念 (庆祝、财富、奖赏、和平)，并探讨了它们通过语言标记和诗意意象的体现。此外，本文还探讨了概念单元历时跨语翻译中常用的翻译策略和技巧，揭示了语言和文化适应如何弥合历史和概念上的鸿沟。

关键词：概念，概念建模，历时翻译，跨语翻译，语言文化学，语言世界观，文化相似性，翻译策略。

Abstract. *This paper explores the conceptual modeling and linguocultural aspects of the feast in Anglo-Saxon (symbol) and Russian (pir) cultures, highlighting both shared features and distinctive elements. The study identifies key microconcepts (celebration, wealth, reward, peace) and their realization through linguistic markers and poetic imagery. It also examines translation strategies and techniques most common for diachronic interlingual translation of the concept units, revealing how linguistic and cultural adaptation can bridge historical and conceptual gaps.*

Keywords: *concept, concept modeling, diachronic translation, interlingual translation, linguoculturology, linguistic worldview, cultural parallels, translation strategies.*

Modern linguistics views language a reflection and, at the same time, a creator of the reality in which a person lives, thereby establishing its close connection with culture (Vinokur, p. 210). An anthropocentric approach that emerged at the end of the 20th century shifted the emphasis from the object of research to the subject of cognition, to a ‘person in language and language in person’, i.e., from the external world to the individual’s experience in language and of language itself. This shift gave rise a new field of study: linguoculturology. The focus of linguo-

culturology is the cultural semantics of language signs, formed at the intersection of language and culture (Maslova, p. 30). One of the key concepts is the concept itself, defined as a ‘mental formation of a high degree of abstraction, reflecting a person’s knowledge and experience, possesses semantic complexity and carries national-cultural markers’ (Bastrikov et al., p. 15).

The concept can be viewed as a multidimensional structure that includes imagery, notional, and value components, each of which is formed in the course of historical development of language and culture (Popova et al., p.15). Concepts reflect the specific worldview and the national perception of reality inherent to a particular ethnic community. Many concepts share significant similarities and demonstrate concurrent development in a diachronic context. The most reliable information about the semantic structure of a concept, its place in the national conceptual sphere, and its role in the consciousness of representatives of different cultures can be obtained by analyzing language data.

It is necessary to distinguish between linguocognitive and linguocultural approaches to studying concepts. The linguocognitive approach views a concept as moving from its representation in individual consciousness to its collective representation in culture. In this framework, a concept is seen as an operational unit of memory, mental lexicon, conceptual system, and the language of the mind. Essentially, it is a mental representation of the worldview reflected in the human psyche (Kubryakova, p.90). In contrast, a linguacultural approach describes the reverse movement: from collective representation to individual understanding. It involves identifying and studying culturally specific elements within mental structures, as well as describing the distinctive semantic features of concepts.

According to V. Karasik, these approaches are not mutually exclusive: from the perspective of cognitive linguistics, the movement proceeds from an individual to culture, while from the linguocultural point of view, it is the reverse: from culture to an individual (Karasik, pp.28-29).

Nearly all classifications distinguish between universal or basic concepts, characteristic of any linguoculture, and national or ethnospecific concepts, which belong to particular linguocultures. In this study, the concept *symbol* (feast) is treated as a national concept, as it possesses traits specific to Anglo-Saxon culture.

As mentioned in Tacitus’ *De origine et situ Germanorum*, the Germans primarily used feasts to negotiate reconciliations between warring factions, arrange marriages, and nominate tribal leaders, believing that it was during the feast that people spoke frankly and were able to reach agreements (Tacitus, p.17). This practice closely describes a cultural realia known in the Anglo-Saxon society as ‘symbol’ – a feast, banquet, entertainment, or celebration.

Symbol is also mentioned in Old Norse texts, in particular in the Poetic Edda’s *Lokasenna* and *Hymiskviða* (Bauschatz, p.51). Feasts are referenced in An-

glo-Saxon poems (*Judith*, *The Dream of the Rood*, *Beowulf*), as well as in Christian monastic literature (*The Exeter Book*, *The Menologium*), and in riddles and proverbs.

Symbol was a part of objective reality for the Anglo-Saxons – it was perceived as a concrete event rather than a metaphorical representation. Conducting a feast and participating in it allowed individuals to fulfill one of the most important social functions of the time: establishing their place and status within the societal hierarchy. A distinct feature of medieval cultural consciousness was the dichotomy of the world, its division into the meaningful (that which had social existence) and the meaningless (belonging to mundane life) (Lotman, pp.402-403). Establishing one's position within the higher strata of the society was crucial, as it determined the existence of an individual as a social entity. This clear distribution of roles emerged in the early feudal Anglo-Saxon society and was driven by the historical reality of the period: the need for a strong army led the monarch to rely on his retinue.

Relations between the monarch and his subjects, as well as within the retinue itself, were strictly regulated and manifested in various aspects of social life, including feasting, where the ceremonial aspect of the event played a central role. Moreover, the relationship between rulers and their retinue was built on the principle of mutual agreement, influenced by the Roman state tradition and foreshadowing the system of vassalage which would later be formalized within the ideology of chivalric society. The principle of agreement and compulsion can be traced in the structure and functions of the feast.

Descriptions of feasts in Anglo-Saxon epic poems and riddles not only highlight the clear structure of the feast as a cultural reality, but also align it with the structural organization of language. This strengthens the unity of the feast by transferring its order to the content plane and increasing the overall degree of organization. The feast can be conventionally divided into six parts:

1. The welcome speech.
2. The distribution of drinks, starting from the ruler to the most important guest and proceeding in descending order of status. It is worth noting that the ritual was performed by a noblewoman, typically the ruler's wife or daughter.
3. The giving of gifts, following the same hierarchical principle. This stage usually began with the breaking of a gold bracelet (*hring* or *wundengold*) by the ruler, who distributed its parts to the most valiant members of the retinue.
4. The *scop*'s song, recounting legends of the past or current events (for instance, the tale of Grendel's attack on Heorot and the story of Finn's sons).

5. The making of oaths and boasts by the participants – a stage which could take place simultaneously with the distribution of drinks and the gifting of treasures.
6. The farewell speech and the conclusion of the feast.

Thus, *symbol* was a unique form of celebration conducted according to strictly established principles and functioned more as a ritual fact than as a mere gathering of a large number of people for the consumption of food and drink.

As the analysis has shown, the key linguistic explication of the concept *symbol* is the word *symbol* itself. The Bosworth-Toller Anglo-Saxon Dictionary defines it as: 1. a feast, banquet, entertainment; 2. a feast, religious festival (Bosworth-Toller).

Etymologically, *symbol* derives from the Old High German **sumlan*, meaning “banquet, symposium, gathering” (compare Middle High German *sament* “together with”, Old Norse *samka*, *samna* “to gather”), which in turn comes from a Proto-Info-European root **sm-lo-* meaning “joint meal” (compare Middle High German *gi-semòn* “to banquet”, Greek «ψωμος» “a morsel, bit”) (Orel, p.386).

Another view, expressed by P. Bauschatz, suggests that *symbol* was formed by joining two roots: *sum/sam*, meaning “collecting, gathering”, and **alu* (or *ealu*), meaning “ale” (Bauschatz, p.52). Thus, *symbol* originally contained the idea of jointness and unity.

The second meaning of *symbol* is that of a religious holiday or ceremony. This can be traced in Christian monastic literature such as *The Exeter Book* and the *Menologium*, as well as in glossaries. For example, Latin glossaries to Anglo-Saxon Gospels define *symbol* as *dies festus, solemnus; cena, prandium, festus, festivitas, solemnus, nuptiae, sabbatum* (Harris, 103; Cook, 183). All these definitions share a common semantic core, or seme: *ceremony*.

The key representative of the concept, which occupies its central, or core, position, has several synonymous nominations. However, each of these nominations activates additional conceptual features that a part of a broader *symbol* concept. Although these features are rather heterogeneous, they nevertheless correlate with each other and have certain interconnections. They form microconcepts, which, in turn, contribute to the actualization of the *symbol* concept in the recipient's mind.

The macroconcept *symbol* is actualized through four interconnected microconcepts: *gamen* (celebration), *lean* (reward), *wela* (wealth), and *sibb* (peace). Each reveals how feasting shaped the worldview of the Anglo-Saxons.

Gamen (celebration) emphasizes the duality of the feast: a joyful break from hardship and a formal event reinforcing social hierarchy. It is further reflected in four distinctive features. The feature *dream* (joy) encompasses shared joy and collective mirth, as seen in lexical items such as *medudream* (joy attending mead-drinking), *seledream* (mirth of the hall), *hælepa dream* (a hero's joy). The feature

sang (music, songs) manifests in *scop* performances (with terms like *gidd*, *hlyn* – songs, lays, and noises) and in verbs denoting making sounds, which range from singing (*singan*) to yelling (*gylian*). *Rest* (rest, relaxation) is implied through the frequent mentions of sitting (*sittan*) as opposed to acting. Finally, *drincas* (alcoholic drinks) are emphasised in ritualised serving of beverages, as well as in the prominence of mead and beer – both as drinks and as integral elements of words denoting feasts and feasting halls (*beorsele* – a beer-hall, *meduful* – a mead-cup, *medubenc* – a mead-bench). This also includes more prestigious wine and the more commonly consumed ale, *seen in terms such as ealowæge* (an ale-cup), *winsele* (a wine-hall), *win of wunderfatum* (wine poured from wondrous vessels).

Lean (reward) emerges as both spiritual and material recompense. The feature *gifu* is dominant, expressed directly in the word *gifu* (the act of giving gifts), as well as through verbs meaning “to give, to bestow, to distribute” (*gifan*, *sellan*, *leanian*, *brytnian*, *dælan*, etc.), which are frequently repeated within a single sentence. This highlights the ruler’s exclusive role as a distributor of gifts. Old English kennings like *sincgyfan* (giver of treasures) and *gold brytta* (distributor of gold) reinforce the link between generosity and power. This dynamic fueled competition within the warband, where lavish gift-giving created loyalty and a system of mutual obligations. In contrast, the feature *heofon* (paradise as a reward) is not expressed as vividly and emerges in Christian texts. The period was marked by its transitional nature in social and economic system, as well as religious beliefs, and this can be seen in how rewards are described in monastic literature. Christ is described as a ruler bestowing gifts upon the saints, his retinue (Cook, p.9). This marks a conceptual shift from tangible, heroic rewards to the promise of everlasting joy, while still retaining a parallel with the earthly feast as a setting of reward.

Wela (wealth) combines material abundance (*fyll*) and luxury (*gleomu*). Terms for gifts like *máðpumsweord*, *sincmaþum*, *wundengold*, descriptions of richly adorned queens (*goldhroden*, *béaghroden*), and kennings for the ruler as the giver of gold (*sincgyfan*, *béaggyfan*, *goldgyfan*) highlight the opulence of feasting halls and the ruler’s elevated status. The term *fyll* (fill, fulness, plenty) is used synonymously with *symbol* to highlight the feast’s immense scale and abundance. Sources emphasize the necessity of a lavish supply of drinks (*ful*), food, songs, speeches, gifts, and oaths at such feasts. The value of the gifts was significant, including up to eight horses (estimated at £11,850–£31,600) and large land grants, such as the 7,000 hides (343,000 hectares) mentioned in *Beowulf*. The number of participants also highlighted the feast’s scale, with the retinue described using terms like *heap* (a great number, crowd) in combinations such as *magorinca heap* and *wigheap*.

Finally, *sibb* (peace) is represented in the following features: *freondscipe* (friendship), *freodo* (protection), and *morþres forbod* (prohibition of murder). In the Anglo-Saxon society, friendly relations developed simultaneously in three di-

mensions: equality, characterized by camaraderie and mutual assistance (for example, Unferth gave Beowulf his sword to help slay the beast, Grendel's mother); subordination (seen in additional semantic components of *freondscipe*: goodwill, graciousness); familial ties (*sibbe*, such as when Beowulf is accepted as kin by King Hrethel) (Schröder, p.16). The queen played a significant role as a peace-maker (*fripusibb folca*), creating a calm, peaceful atmosphere at feasts by giving cups with beverages to the warband, thus highlighting that feud and fierce rivalry were not accepted.

The ruler had an obligation to protect his warriors. This is represented in the feature *freoðo* (protection), which is evident in kennings for denoting the ruler as the protector of people, peace, and wealth (*hordweard haelepa*, *béahhorda weard*, *folces hyrde*, *rices hyrde*).

The conceptual feature of “prohibition of murder” was integral to social order. Sources such as *Beowulf* or *The Exeter Book* show that even in a drunken state, warriors were expected to uphold the rules of peaceful conduct (*nealles druncne slog heorðgenéatas*) (Slade; Thorpe, pp. 301-302). In heroic and religious poetry, the dichotomy of “good” (society) versus “evil” (chaos, non-social realm) emphasizes the feasts's role as a ritual maintaining social harmony. Thus, monstrous killings are a perversion of human feasts, as seen in the contrasting terms *wistfyll* (“abundant food”) and *waelfyll* (“bloody feast. This feature also appears in *Beowulf* through the lexeme *ealuscerwen*, describing Grendel's slaughter of feasting warriors.

In modeling the concept in interlingual translation, the translator inevitably faces challenges. On the one hand, due to the differences between the source and target cultures, it is impossible to establish a precise correspondence between the concept's linguistic representations. On the other hand, the translator's task is to convey the cultural and historical nuances of the period that are embedded in the text.

The nature of feasts in Rus' largely coincided with that of the ancient Germanic peoples. Feasts were ceremonial events held across all social classes to celebrate holidays or victories. In contrast to the Anglo-Saxon *symbol*, Russian feasts placed great emphasis on the abundance of food. The festive table was laden with as many dishes as possible, and their distribution was strictly regulated by the status of the guests (Artemov, p.320). Seating arrangements also followed strict hierarchies: guests were placed in three ranks—high, middle, and low—reflecting their social position (Platonov, p.577).

Drinking also played a central role: it was important to drink generously to avoid insulting the host, yet it was frowned upon to become excessively drunk. As among the ancient Germanic peoples, the primary drinks were mead, beer, and, later (11th–12th centuries), wine. Popular as well was *braga*, one of the oldest

Slavic alcoholic drinks. Drinking was governed by precise customs, including the sharing of a communal cup—often offered by the hostess. Alternatively, the host would take the first drink, with guests following. Traditionally, the host would bow each time a guest emptied his cup. After meals, drinking and toasts continued.

Russian *byliny* often describe military feasts, which share structural similarities with the Anglo-Saxon *symbol*. The military leader would distribute spoils and reward his warriors with gifts. Warriors would boast of their deeds or social rank (for example, *zolotoi kaznoi, siloi molodetskoi* (of golden treasures and youthful strength)) and were often required to prove their claims (*bit' ob zaklad* – to strike the wager). Rewards included money, furs, livestock, and horses.

In *The Tale of Igor's Campaign*, many researchers note a special usage of the word *pir* (feast): *...tu pir dokonchasha khrabrye rusichi; svaty popoisha, a sami polegsha za zemliu Rus'kuiu... (Here the bold sons of Rus' finished the feast: They gave the matchmakers drink, And lay down themselves for the Russian land)* (Bulanin, p.10; Mann, p.28). Here, the author equates the feast with battle, echoing the episode in *Beowulf* where Grendel's attack on Heorot is described with kennings like *ealuscerwen* and *waelfyll*, meaning “bloody feast.”

This suggests that while there are clear parallels in how the idea of the feast was conceptualized in the naive worldview of these cultures, there are also significant differences. The analysis of both intralingual and interlingual translations—through the correlation of linguistic units in primary and secondary texts—enables us to identify how this concept was modeled in each culture.

For example, in the Russian translations of Anglo-Saxon texts by V. Tikhomirov and O. Smirnistkaya, translators used transformations such as specification (“*symbol*” – *pishcha pirshestvennaya* (festive meal, feast food), *trapeza* (banquet, table feast), *pir-vinopitie* (wine feast)), synonymous substitution (“*symbol*” – *pirshestvo* (feast, banquet);), semantic expansion (“*symbol*” – *pishcha* (food), *vinopitie* (wine drinking)), and part-of-speech changes (“*symbol*” – *pirovat'* (to feast)). Special attention was paid to stylistic adaptation: occasionally using pseudo-archaic forms or bookish vocabulary like *zastol'ye* (banquet, feast), *trapeza*, *pirshestvo*. Although these choices help convey the cultural essence of the Anglo-Saxon feast in a form accessible to a Russian audience, they also inevitably evoke associations of food and communal eating, shifting the meaning slightly. This is because even the most neutral Russian equivalent for *symbol*, *pir* (feast), still carries the idea of eating.

Conversely, in the translation of *The Dream of the Rood*, where *symbol* refers more to eternal joy or reward than to an earthly ceremony, the translator chose the verb *prazdnovat'* (to celebrate), both changing the part of speech and broadening the meaning (Smirnistkaya et al., p.89).

These translation strategies help to bridge the cultural and linguistic divide between the Anglo-Saxon worldview and that of Russian readers, while also reflecting the distinct nuances of each. Thus, the study reveals that despite certain parallels in the conceptualization of *symbol* and *pir*, there are important differences in their modeling across Anglo-Saxon and Russian cultures. These differences highlight the unique linguistic, cognitive, and cultural specifics of each tradition.

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新媒体对中国国际传播研究的影响：以TIKTOK为例
**THE IMPACT OF NEW MEDIA ON INTERNATIONAL
COMMUNICATION RESEARCH IN CHINA: THE CASE OF
TIKTOK**

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通过 TikTok 实现的中国国际传播生态系统的转型代表了从制度化媒体框架到算法驱动的参与式网络的范式转变。在平台社会理论 (van Dijck, Poell, & de Waal, 2018) 的基础上, 本研究揭示了 TikTok 的技术能力如何促进三种颠覆性机制: (1) 用户生成的文化翻译, 73.4% 的中国相关内容由非中国创作者重新混音 (Wu & Sun, 2022, p.517 Brady et al., 2021, Table 2); (3) 算法议程设置, 推荐系统放大非政治文化符号 (美食/音乐/科技占中国标签病毒内容的 82%, Facebook 占 37%; Pew Research Center, 2023, p.15)。

我们采用混合方法设计, 分析了 2,317 个流行视频 (通过 TikTok 的商业内容库 API 收集) 和 12 个国家的 43 个创作者访谈。网络分析 (Gephi 0.9.7) 证明了这一点: 多中心传播: 中国相关叙事通过东南亚 (31.2%) 和非洲 (22.7%) 的创作者节点, 绕过西方媒体把关人 ($\beta=0.53$, $p<0.001$; Nie & Wang, 2023, p.462), 到达次级受众。时间动态: 参与高峰出现在世界协调时 14:00-16:00, 此时亚洲、欧洲和美国用户活动重叠 (K-S 检验 $D=0.21$, $p<0.05$)

理论贡献包括: 通过量化 “算法软实力” 扩展了媒介公共外交理论 (文化接近度得分与推荐频率之间的 $R=0.78$), 确定了平台化的文化流动, 与 2019 年的基线相比, “中国折扣” 效应减少了 39% (Shan 和 Chen, 2022 年, 图 4), 政策影响凸显了以下需求:

算法民族主义的透明协议 (参考《欧盟数字服务法》第 27 条), 针对全球南部有影响力的 Z 世代的创作者交流计划 (试点试验中的效应大小 $d=1.2$)

关键词: 国际交流、TikTok、算法外交、跨文化交流、数字公共外交、Z世代

Abstract. *The transformation of China's international communication ecosystem through TikTok represents a paradigm shift from institutionalized media frameworks to algorithm-driven participatory networks. Building on platform society theory (van Dijck, Poell, & de Waal, 2018), this study reveals how TikTok's technical affordances facilitate three disruptive mechanisms: (1) user-generated cultural translation, where 73.4% of China-related content is remixed by non-Chinese creators (Wu & Sun, 2022, p.517); (2) emotionally optimized virality, with facial recognition data showing 68% higher engagement rates for joy/surprise-valenced content versus neutral tones (Brady et al., 2021, Table 2); and (3) algorithmic agenda-setting, where recommendation systems amplify non-political cultural symbols (food/music/tech constitute 82% of China-tagged viral content vs. 37% on Facebook; Pew Research Center, 2023, p.15).*

Employing a mixed-methods design, we analyze 2,317 trending videos (collected via TikTok's Commercial Content Library API) and 43 creator interviews across 12 countries. Network analysis (Gephi 0.9.7) demonstrates:

Polycentric diffusion: China-associated narratives reach secondary audiences through Southeast Asian (31.2%) and African (22.7%) creator nodes, bypassing Western media gatekeepers ($\beta=0.53$, $p<0.001$; Nie & Wang, 2023, p.462)

Temporal dynamics: Peak engagement occurs at UTC 14:00-16:00 when Asian, European and American user activity overlaps (K-S test $D=0.21$, $p<0.05$)

Theoretical contributions include:

Extending mediated public diplomacy theory by quantifying "algorithmic soft power" ($R=0.78$ between cultural proximity scores and recommendation frequency)

Identifying platformized cultural flows that reduce "China discount" effects by 39% compared to 2019 baselines (Shan & Chen, 2022, Figure 4)

Policy implications highlight the need for:

Transparency protocols for algorithmic nationalism (referencing EU Digital Services Act Article 27)

Creator-exchange programs targeting Gen-Z influencers in Global South (effect size $d=1.2$ in pilot trials)

Keywords: *international communication, TikTok, algorithmic diplomacy, intercultural communication, digital public diplomacy, Generation Z.*

Introduction

The globalization of Chinese digital platforms, particularly the meteoric rise of TikTok (known as Douyin in China), has precipitated a fundamental reconfiguration of international communication paradigms. As traditional state-led media systems grapple with declining credibility among global youth audiences (Pew Research Center, 2023, p.8), algorithmic short-video platforms have emerged as

critical infrastructures for cross-cultural engagement. This study interrogates how TikTok’s techno-cultural architecture facilitates China’s international communication through three understudied mechanisms: decentralized narrative production, emotion-driven algorithmic amplification, and hybridized cultural translation.

1.1 Theoretical Significance

Existing scholarship on international communication remains entrenched in “media imperialism” frameworks (Thussu, 2019, Chapter 3), while contemporary research on digital platforms predominantly focuses on Western social media ecosystems (e.g., Meta’s algorithmic governance; see Gillespie, 2022, pp.45-47). The TikTok phenomenon challenges these theoretical orthodoxies by demonstrating:

Platformized cultural flows that reduce “China discount” effects by 39% compared to 2019 baselines (Shan & Chen, 2022, Figure 4)

Algorithmic intermediation of state narratives through creator economies (76% of viral China-related content originates from non-state actors; Wu & Sun, 2022, p.519)

1.2 Empirical Context

With 1.53 billion monthly active users globally (Statista, 2023), TikTok has achieved unprecedented penetration in traditionally hard-to-reach markets:

78% of Southeast Asian users engage with China-tagged content weekly (Napoli & Obar, 2022, Table 1)

Average watch time for China-related videos exceeds platform mean by 42 seconds (App Annie, 2023)

This study builds on original datasets from TikTok’s API (n=2,317 videos) and creator interviews (n=43) to address two research gaps:

How algorithmic recommendation systems reconfigure the agency of nation-states in international communication (cf. van Dijck et al., 2018)

Whether platform affordances can mitigate geopolitical biases in cross-cultural perception (extending Brady et al., 2021)

1.3 Policy Urgency

Recent regulatory actions against TikTok in multiple jurisdictions (e.g., U.S. Congressional hearings, EU Digital Services Act compliance demands) underscore the geopolitical stakes of platform governance. Our findings provide empirical grounding for:

Evidence-based content moderation policies (reference to UNESCO’s Internet Universality Indicators)

Strategic calibration of “algorithmic diplomacy” in Global South markets (World Bank, 2022, p.17)

The subsequent sections proceed as follows: Section 2 reviews theoretical foundations, Section 3 details our mixed-methods approach, with Sections 4-5

presenting findings and discussing implications for communication theory and digital policy.

2. Literature Review

The study of international communication has undergone a paradigm shift with the rise of digital platforms, and TikTok's emergence presents a critical case for re-examining traditional theories. This section synthesizes existing scholarship across three key dimensions: (1) the new media turn in international communication theory, (2) China's distinctive approach to global media influence, and (3) the algorithmic mediation of cross-border flows, establishing the theoretical foundation for this study.

2.1 The New Media Turn in International Communication

Traditional frameworks like media imperialism (Thussu, 2019, p. 45) have been challenged by decentralized digital ecosystems where user-generated content (UGC) rivals institutional media in shaping global narratives (Benkler, 2018, p. 112). TikTok exemplifies this shift through:

Decentralized narrative production: Algorithmic recommendation systems amplify non-state actors, with 78% of viral China-related content originating from independent creators—compared to just 42% on YouTube (Pew Research Center, 2023, p. 12; Wu & Sun, 2022, p. 515).

Emotion-driven virality: Affective content (e.g., joy/surprise) achieves 68% higher engagement than neutral narratives, per experimental facial recognition data (Brady et al., 2021, Table 2).

Reduced cultural discount: Visual storytelling in TikTok mitigates linguistic barriers, increasing non-Chinese engagement with cultural content by 39% versus long-form video (Shan & Chen, 2022, Fig. 4).

2.2 China's Platformized Public Diplomacy

China's international communication operates through a state-platform-user triad (Zhao, 2021, p. 33), with TikTok serving as a dual agent of state influence and market logic:

Infrastructure leverage: The Digital Silk Road initiative facilitated TikTok's penetration in Global South markets, where its user growth outpaces Meta's by 22% (Napoli & Obar, 2022, Table 2; Wu, 2023).

Civilianized soft power: Grassroots creators (e.g., @liziqi) outperform state media (e.g., CGTN) in audience trust metrics (Yang & Tang, 2023, p. 77).

Geopolitical friction: Despite content depoliticization, U.S. and EU regulatory pressures (e.g., DSA Article 27) constrain TikTok's agency (Gillespie, 2022, Ch. 5).

2.3 Algorithm-Mediated Communication (AMC): A New Framework

Bridging platform society theory (van Dijck et al., 2018) and cross-cultural adaptation models (Kim, 2017), this study proposes an AMC framework to analyze:

Algorithmic cultural bias: TikTok's recommender system prioritizes high-arousal, culturally proximate content (Nie & Wang, 2023, p. 460).

Behavioral platformization: User preferences are recursively shaped by engagement metrics (Zuboff, 2019, p. 145).

State-algorithm tensions: China's data governance laws (e.g., PIPL) interact with platform autonomy (Creemers, 2022, p. 18).

3. Research Methods

This study employs a mixed-methods design, integrating computational data analysis with qualitative interviews to examine TikTok's role in China's international communication. The methodological framework consists of three phases: (1) large-scale content collection via TikTok's API, (2) network and sentiment analysis of viral trends, and (3) in-depth interviews with content creators.

3.1 Data Collection

3.1.1 Sample Selection

We extracted 2,317 China-related viral videos from TikTok's Commercial Content Library API (v.19) between January 2022 and June 2023, using the following criteria:

Hashtags: #China, #ChineseCulture, #MadeInChina, #TravelChina (plus 12 region-specific tags).

Engagement threshold: Videos with $\geq 500,000$ views and $\geq 10\%$ share rate (per TikTok's virality index).

Geodiversity: Top 20 countries by engagement (U.S., Indonesia, Brazil, etc.).

3.1.2 Metadata Variables

For each video, we collected:

Performance metrics: Views, likes, shares, comments, and average watch time.

Content features: Audio/text captions (translated via Google NLP API), hashtags, and creator nationality.

Temporal data: Upload time, peak engagement window (UTC).

3.1.3 Ethical Compliance

Data anonymized per GDPR/China's PIPL (removing user IDs).

API access obtained via TikTok's Research API License (Approval #TKL-2023-0147).

3.2 Analytical Methods

3.2.1 Network Analysis (Gephi 0.9.7)

We constructed a bipartite network of creators \leftrightarrow hashtags to identify:

Community clusters (modularity > 0.4 , Fig. 1a)

Influencer nodes (eigenvector centrality > 0.7)

Example finding: A Southeast Asian creator cluster (#Bali, #ChineseFood) bridged Chinese and Western audiences.

3.2.2 Sentiment Analysis (VADER + Manual Coding)

Automated scoring: VADER lexicon quantified emotional valence (-1 to +1).

Manual validation: 300-video subset coded by bilingual researchers (Krippendorff's $\alpha=0.82$).

3.2.3 Creator Interviews (n=43)

Recruitment: Top 5% China-related creators by engagement (snowball sampling).

Protocol: Semi-structured Zoom interviews (avg. 52 mins), transcribed via Otter.ai.

Thematic analysis: NVivo 14 coded for algorithm perception, content strategy, and geopolitical awareness.

3.3 Validation & Limitations

Robustness checks:

API data cross-verified with Brandwatch's TikTok tracker ($r=0.91$, $p<0.001$).

Network analysis replicated in NodeXL (consistent cluster patterns).

Limitations:

Selection bias: API excludes private/deleted videos.

Temporal scope: Pre-2022 data unavailable due to API constraints.

4. Research Findings

Our analysis reveals three key dimensions through which TikTok is reshaping China's international communication landscape: algorithmic cultural mediation, decentralized narrative networks, and platform-driven emotional engagement. These findings challenge conventional understandings of state-led public diplomacy while demonstrating the growing influence of platform affordances in global communication flows.

4.1 Algorithmic Cultural Mediation

The TikTok recommendation system exhibits distinct patterns in amplifying China-related content:

1.Cultural Proximity Bias: Content featuring universally recognizable cultural symbols (food, music, scenic landscapes) received $3.2\times$ more recommendations than political/economic topics ($\beta = 0.41$, $p < 0.01$). This aligns with Nie and Wang's (2023, p. 467) concept of "algorithmic cosmopolitanism," where platforms privilege culturally fluid content.

2.Temporal Amplification: China-related videos posted during UTC 14:00-16:00 (coinciding with peak activity in Asia, Europe and North America) achieved 58% higher completion rates than other time slots (K-S test $D = 0.21$, $p < 0.05$), suggesting algorithmic preference for globally optimized timing.

3.Creator Hierarchy: Verified accounts (blue checkmarks) generated only 12% of viral China content, while "micro-influencers" (10k-100k followers) accounted for 63% of high-engagement posts, corroborating Wu and Sun's (2022, p. 521) findings on platform democratization.

Visualization: Figure 2 shows the nonlinear relationship between cultural proximity scores and recommendation frequency ($R^2 = 0.78$).

4.2 Decentralized Narrative Networks

Network analysis uncovered three distinct diffusion patterns:

1.Polycentric Diffusion: 72% of China-related narratives reached Western audiences through Southeast Asian and African creator nodes (see Figure 3), with Indonesian creators particularly effective as cultural bridges (modularity = 0.43).

2.Hashtag Hybridization: Successful tags combined Chinese and local references (e.g., #ChineseFood + #JakartaStreetFood), generating 39% more shares than mono-cultural tags (t-test, $p < 0.001$).

3.Platform-Specific Framing: Compared to Twitter, TikTok content emphasized:

Personal experiences over institutional narratives (84% vs. 23%)

Visual aesthetics over textual arguments (91% vs. 34%)

(Data source: Cross-platform analysis of 500 matched topics)

4.3 Emotional Engagement Dynamics

Sentiment analysis revealed:

1.Valence Impact: Positive-affect videos (joy/surprise) achieved:

2.1× more shares than neutral content

1.7× more comments than negative content

(VADER sentiment scores correlated at $r = 0.69$ with engagement)

2.Cultural Emotion Mapping: Certain emotions showed cross-cultural variation:

Western audiences: Stronger response to “awe” ($d = 0.82$)

Global South: Preference for “family warmth” themes ($d = 1.03$) (ANOVA $F = 7.21$, $p < 0.01$ across 8 cultural clusters)

3. Duration-Emotion Tradeoff: High-arousal content maintained engagement despite shorter durations (see Table 1), supporting Brady et al.’s (2021, p. 5) “emotional efficiency” hypothesis.

Table 1.
Emotion-arousal relationships in China-related content

Emotion	Avg. Duration	Completion Rate
Joy	23.4s	68%
Surprise	19.1s	72%
Neutral	41.2s	53%
Anger	15.7s	47%

5. Conclusion

This study yields three fundamental insights about TikTok's role in China's international communication ecosystem, with significant theoretical and practical implications.

5.1 Theoretical Advancements

Our findings necessitate a reconfiguration of traditional international communication theories:

1. Beyond Media Imperialism: The observed polycentric diffusion patterns contradict the core assumptions of media imperialism theory (Thussu, 2019, p. 58), demonstrating how algorithmic platforms enable non-Western countries to bypass traditional media gatekeepers. This supports Zhao's (2021, p. 112) concept of "networked asymmetry" in digital communication flows.

2. Algorithmic Agency: The documented cultural proximity bias in TikTok's recommendation system extends van Dijck et al.'s (2018) platform society theory by quantifying how algorithms actively shape - rather than passively transmit - cross-cultural narratives ($\beta = 0.41$, $p < 0.01$).

3. Emotional Infrastructure: The strong correlation between affective content and engagement ($r = 0.69$) validates the emerging paradigm of "emotional public diplomacy" (Yang & Tang, 2023, p. 85), where platform architectures privilege certain emotional registers over rational discourse.

5.2 Practical Recommendations

Based on our empirical findings, we propose three evidence-based strategies:

5.2.1 For Content Creators:

Cultural Code-Switching: Adopt hybrid hashtag strategies (e.g., #ChineseDumplings + #MexicanFoodLover) to increase algorithmic visibility, building on our observed 39% engagement boost for such combinations.

Temporal Optimization: Schedule posts during identified high-engagement windows (UTC 14:00-16:00) to leverage algorithmic amplification patterns.

5.2.2 For Policymakers:

Algorithmic Transparency: Establish clear metrics for cultural representation in recommendation systems, modeled after the EU Digital Services Act's (2022) content moderation requirements.

Creator Exchange Programs: Develop structured initiatives pairing Chinese micro-influencers (10k-100k followers) with international counterparts, capitalizing on our finding that this group drives 63% of high-engagement content.

5.2.3 For Platform Operators:

Cultural Bias Audits: Implement regular algorithmic audits using our cultural proximity framework to identify and mitigate unintended content suppression.

Emotion-Aware Design: Develop creator tools that provide real-time feedback on emotional valence scores, building on VADER's validated sentiment analysis capabilities (Hutto & Gilbert, 2014).

5.3 Future Research Directions

We identify three critical areas for further investigation:

1.Longitudinal Platform Evolution: Track how TikTok's algorithm adjustments (e.g., 2023's increased weight on watch time) affect China-related content flows over time.

2.Comparative Platform Analysis: Extend our methodology to examine differences between TikTok and competing platforms like YouTube Shorts or Instagram Reels.

3.Generational Effects: Explore how Gen Z's platform-native communication styles (identified in our interview data) may reshape international relations paradigms.

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俄罗斯法学教育发展问题探讨
ON THE ISSUE OF THE DEVELOPMENT OF LEGAL EDUCATION
IN RUSSIA

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注释。本文探讨了古罗斯时期及之后时期法学教育的兴起、形成特点、西方文化对其的影响、我国自身法学教育方法的形成以及法学教育在现代条件下的重要性。

关键词：教育，法学教育。教会教育。世俗教育。教育内容。教育质量。理性化、技术化及其积极和消极影响。

Annotation. *The article discusses the emergence of legal education in the period of Ancient Rus and in subsequent periods. About the features of its formation. About the influence of Western culture on it. About the formation of our own approaches to legal education. About the importance of legal education in modern conditions.*

Keywords: *Education, legal education. Church education. Secular education. Content of education. Quality of education. Rationalization, technicalization, their positive and negative impact.*

It is believed that education as an organized process arose in Rus' after its baptism by Vladimir. It was presented in the form of church education aimed at studying church books.¹, to form church ministers who were called upon to justify the origin, relationship, purpose of church and secular authorities and the need to obey them.

Baptism, the passive way of life instilled in them by the military elite who did not accept them, was seen as obedience to an alien power², as a subordination

¹ People benefit greatly from book learning, wisdom is gained from book words, books guide one to the path of repentance, as is said in the Tale of Bygone Years. See: Tale of Bygone Years // Library of Literature of Ancient Rus. Volume 1. 11th-12th centuries. St. Petersburg, 2004. Page 195.

² See: Eusebius Pamphilus. Address to Tsar Constantine on the Occasion of the Thirtieth Anniversary of His Reign. Works. Vol. 2. St. Petersburg, 1849. Pp. 357-358; Epistle of the Holy Apostle Paul to the Romans. 13; 1,2; John Chrysostom. Homilies on the Epistle to the Romans // Works of our Holy Father John Chrysostom in 12 volumes. St. Petersburg, 1895-1906. Vol. 12. Book 2. P. 775.

to the Byzantine Empire³. Therefore, Vladimir had to impose both baptism and church teaching by force. For the sake of education, he took children⁴ from the common folk⁵ and placed them in boarding schools with a strict daily regimen and close supervision.

A similar practice developed during Peter the Great's time. According to Peter's decree of 1723, there was an order to recruit priests', deacons' and clergymen's children into schools, all those who could, and those who did not want to, those "to be taken to schools" by force.

In the second half of his reign, Vladimir began to avoid violence. He opened schools, but still with mandatory teaching of church books. From 1096, such institutions were opened at monasteries and churches throughout Rus'.

Yaroslav established the first public school in Novgorod, which housed 300 youths.⁴- children of Presbyters (priests) and Elders. They were not alienated from the family, they acquired knowledge necessary mainly for the Holy Order⁵ and to some extent for the civil service.

The content of church education did not include rational and other knowledge developed in ancient times. Later, home education, which arose, had basically the same focus, and was carried out by foreigners who often did not have the necessary knowledge and came to Russia to earn money.

Libraries appeared at the monasteries. Yaroslav founded a library in St. Sophia of Kyiv, which contained no less than 950 books, mainly church books, but also books on philosophy, astronomy, and geography.

Weakened by the Tatar-Mongol raids, Kievan Rus found itself in the power of Lithuanian, Polish, and German conquerors; on the basis of the Union of Lublin in 1569, it became part of the Polish-Lithuanian Commonwealth.

The unification required political, ecclesiastical, and cultural unity. A reorientation from East to West began: the people's national memory, language, and culture were destroyed, and a new model of religious worldview was introduced.

The need for schools arose: both officials and churchmen needed literate people. Church parish schools of fraternities were spreading. A teaching class was formed from people who had spiritual rank and carried out service in the temple.

In 1615, the Kiev Brotherhood was founded, and in 1631, the Kiev-Pechersk Lavra School, which united into the Kiev Brotherhood College, which in 1635 became the Kiev-Mohyla Academy, the first higher school in Eastern Europe.

³ Similarly, at present, in the eyes of the nationally oriented part of the population, the borrowing of the liberal democratic ideology of the West is seen as subordination to it.

⁴ It is not known what the intake was at Vladimir's school, but 300 boys were a large number for Novgorod at that time. The Moscow Slavic-Greek-Latin schools, called Academies during their heyday, would be proud of such a number.

⁵ The sphere of church jurisdiction included issues of marriage, family, inheritance, social and everyday life, and social and moral life.

It had three main directions: theological, linguistic, general education. The content of education was mainly of a church-scholastic nature. Under Catherine II and Alexander I, attempts were made to introduce secular disciplines to the lower and middle classes, including history, architecture, and painting.

Graduates of this academy were the founders of the first higher educational institutions in Russia, including the Slavic-Greek-Latin Moscow Academy, the first higher educational institution in Russia, opened by S. Polotsky, a graduate of the academy.

This academy was ordered in the charter given by Tsar Feodor Alekseevich to teach “the teaching of justice, both spiritual and secular.”⁶ S. Solovyov gave a negative assessment to this⁷.

It is believed that the Kiev-Mohyla Academy influenced the nature of education at the Tsarskoye Selo Lyceum, the Demidov Lyceum in Yaroslavl, at the grand opening of which on August 13, 1804, Ivan Sreznevsky delivered his famous speech “On Love for the Fatherland”, and the Katkovsky Lyceum in Moscow. They taught not only natural and folk law, not just jurisprudence (which was not the case at the Kyiv Academy⁸), training was carried out within the scope of the Faculty of Law.

In 1665, a school was opened at the Zaikonospassky Monastery under the leadership of Semyon Polotsky. Latin, which was the language of diplomacy, and Russian grammar were studied there. Among the students was Semyon Medvedev, who later became a scientist, writer, and monk Sylvester.

In 1666, in connection with the Nikon case, S. Polotsky delivered an oration before the tsar about the need to “seek wisdom,” i.e., about the need to raise the level of education in the Russian state.

Since the 18th century, secular educational institutions have been created⁹, in which the teaching of law, ethics, and politics is carried out. An indication of their teaching is contained in the school opened in 1703 in Moscow, which is called “Naryshkinsky”¹⁰ Since 1721, legal training has been organized in the College of

⁶ The order remained unfulfilled. See: Smirnov. History of the Moscow Academy. St. Petersburg, 1855. P. 12.

⁷ S. M. Solovyov said that this was not only a school, but a terrible inquisitorial tribunal that recognized guilt in non-Orthodoxy, for which the guilty could end up at the stake. See: Solovyov S. M. History of Russia from Ancient Times. Vol. 13, Ch. 2.

⁸ But this question is passed over in silence, in particular, by Joseph Krakovsky, who taught a course in philosophy in 1686 and 1687, as evidenced by the summary of this course provided by Makarii Bulgakov. See: Makarii Bulgakov. History of the Kyiv Academy. St. Petersburg, 1843. Pp. 66, 67.

⁹ In 1703, the Naryshkin School was created, in 1721 – the College of Junkers, in 1725 – the Academy of Sciences, in 1732 – the Cadet Corps, in 1755 – Moscow University. Later – universities in Kharkov, Kazan, and St. Petersburg.

¹⁰ It was located in the house of the deceased boyar Vasily Fedorovich Naryshkin. Its first director was the Livonian Ernest Gluck. Ioann Reichmuth taught there. It was closed in 1715.

Junkers.¹¹The right is discussed in the general regulations, in the heraldry instructions and table of ranks published in the following year of 1722.

The King of Arms's Instruction prescribed the establishment of a short school for the study of civil and economic affairs, and the Table of Ranks speaks of "a legal court, foreign and domestic trades - for the profit of the empire and savings." Here, wrote Vladimirsky-Budanov (1838-1916), a combination of legal education in the proper sense of the word with economic education is outlined, which was established in legal education and began to characterize its peculiarity, added M.N. Korkunov¹².

These were the beginnings of the study of law. The continuation is connected with universities. The first university was the Academy of Sciences, created in 1725, which was intended to be not only a scientific institution, but also an educational, academic university. It had a department of jurisprudence. In 1726, Bekenstein, who lectured at the University of Koenigsberg, was invited to the academy for five years as a professor of jurisprudence. He wrote a manual for heraldry, which was then considered a legal subject.

Bekenstein's successor was Strube, Biron's former secretary, appointed an academician in 1738, not distinguished by honesty and conscientiousness, very active, taking on any task. He declared that it was indecent to explain the civil law of the ancient Romans to the youth, that it was necessary to publish a short guide to Russian law.

Instead, he presented a selection of current laws and verbatim what was contained in printed books – this was the conclusion given by the academic chancellery. His successor from 1759 to 1770 was Georg Friedrich Feodorovich, the last lawyer in the academy. All the professors of law were not Russian, expounded Western science, and lectured in a language other than Russian.

The chair of legal philosophy was occupied from 1725 to 1731 by H.F. Gross, who lectured on Puffendorf, who was considered an indisputable authority in the West, especially in Germany, based on his work "On the Duties of Citizens and Man"¹³.

¹¹ A similar institution arose back in 1716 at the Military Collegium, when it was ordered "to take twenty good and young men from the young gentry who could read and write to the Military Collegium for the science of auditing" (Decree of April 11, 1716). Only seven men were found, and even they were unfit for auditing due to their youth. One was taken on a second request, but he was also weak in arithmetic. There are no indications of further calls for young men to study auditing. It is assumed that later the general regulations on the Collegium of Junkers were applied in the Military Collegium. See: Bobrovsky. Development of Methods and Means for the Education of Lawyers of the Military and Naval Departments in Russia. St. Petersburg. 1879. Page 259.

¹² See: Vladimirsky-Budanov M.F. Review of the History of Russian Law. Rostov-on-Don. 1995. P. 175; Korkunov N.M. Philosophy of Law. Lecture Guide. Third ed. St. Petersburg, 1903. P. 263.

¹³ He then transferred to the Brunswick embassy in St. Petersburg, was brought to justice under Elizabeth, and shot himself in 1741.

At Moscow University, the content of education also consisted of the assimilation of the results of Western legal science, based on a rational approach, a materialistic worldview, and the theory of natural law.

During the first ten years, the Faculty of Law was represented by F. G. Diltthey, Doctor of Law from the University of Vienna, who lectured on Roman and state law in French. His main focus was natural law. He expounded it, like Gross, according to S. Puffendorf.

The first fifty years of the Moscow University coincide with the reign of Catherine, her mandate, written under the influence of the French enlighteners. In the Alexander era, with its enlightenment and liberal direction, they almost introduced French codes.

The official directive was aimed at ensuring that the first Russian professors (S.E. Desnitsky, I.A. Tretyakov, A.Ya. Polenov) would focus their teaching on Western legal science, which was alien to historical soil.

A serious confrontation between the Russian and the foreign arose. It manifested itself in political and legal thought, in education, in management, and in legislation. N. M. Korkunov called the resulting atmosphere a complete mess. This situation made it difficult for Russian scientists who did not submit to Western influence and the instructions on this path. They saw the way out of this situation in focusing on their spiritual, moral values, on their enlightenment, education, and upbringing.

A. Y. Polenov, who had shown persistence in proving to academics the necessity of a historical education for a lawyer, was forced to leave education. S. E. Desnitsky, in spite of everything, took up the theoretical study of the Russian state, state power, law, and was the first to give lectures in Russian and Russian law. Under the influence of his lectures, Z. A. Goryushkin, wrote N. M. Korkunov, realized “the vanity of a single practical study of jurisprudence.”¹⁴

The Russian professor was highly respected, whose name became known through lectures delivered in auditoriums, through speeches at ceremonial university events, through his influence on students. It was the Russian professors, their lectures, public speeches that had a huge significance for the creation of domestic education and for the development of legal science. They nourished future theorists and practitioners, through them they influenced the development, the development of law, the adoption of decisions.

The current situation is characterized by increasing rationalization and massive technicalization, which, on the one hand, are necessary in the modern world, but on the other hand, disrupt the harmony in it.

¹⁴ See: Korkunov N.M. Philosophy of law. St. Petersburg, 1903. S. 265, 269, 270, 275, 276, 279, 280.

The aggressive struggle for world domination, for the redivision of the world, accompanied by the destruction of unwanted peoples and their states, has led to the emergence of numerous geopolitical and national problems.

The right decisions are necessary to free ourselves from the transhumanist ideology, to prevent the dehumanization of man. They are necessary to direct human evolution, which has moved away from the evolution of nature under the influence of modern civilization, into the channel of global co-evolution, i.e. the joint development of man with everything that surrounds him.

The fate of Russia today largely depends on correct political, legal, and other decisions. Correct decisions are associated with serious scientific justifications, which are provided by a solid ideological and ideological foundation, a high level of theoretical training, and high-quality professional education.

This requires a significant change in attitudes towards legal science, towards the quality of legal education, which since the 90s of the last century have been oriented towards Western attitudes, which have again led to a serious confrontation between the Russian and the foreign. And once again, how relevant are the words of S. Polotsky in the 17th century about the need to raise the level of education in the Russian state!

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教师职业倦怠的成因及影响因素：心理学与教育学分析

CAUSES AND FACTORS OF PROFESSIONAL BURNOUT OF TEACHERS: PSYCHOLOGICAL AND PEDAGOGICAL ANALYSIS

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注释：本文探讨了教师职业倦怠的成因和影响因素，并结合现代社会经济和教育体系的组织变革进行了探讨。基于现有数据，本文识别出主要的压力源，包括情绪超负荷、教育过程的官僚化、教师职业社会地位低下以及教师的个人特征。本文特别关注疫情后教师职业倦怠的动态及其可能的预防措施，并介绍了一项旨在评估教师情绪衰竭程度的先导实验的结果。该研究结果可用于制定支持教师的方案。

关键词：职业倦怠；情绪衰竭；教学压力；教育环境；劳动心理学。

Annotation. *The article examines the causes and factors of professional burnout among teachers, considered in the context of modern socio-economic and organizational changes in the education system. Based on current data, key stressors are identified, including emotional overload, bureaucratization of the educational process, low social status of the profession and personal characteristics of teachers. Particular attention is paid to the post-pandemic dynamics of the problem and possible preventive measures, and the results of a pilot experiment aimed at assessing the level of emotional exhaustion among teachers are presented. The results of the study can be used to develop programs to support teaching staff.*

Keywords: *professional burnout; emotional exhaustion; pedagogical stress; educational environment; labor psychology.*

Professional burnout of teachers has long ceased to be a narrowly psychological problem, turning into a social phenomenon that threatens the sustainability of educational systems. The term, introduced by Freudenberger in 1974 and detailed by Maslach [1], is today interpreted as a consequence of chronic stress associated with emotional, cognitive and physical overload. In the context of the transformation of education - digitalization, inclusive practices, the growth of administrative control - the risks of burnout are increasing. Thus, according to Education International (2023), 58% of teachers in Europe demonstrate at least one symptom of burnout, and in Russia this figure reaches 67% [4].

The relevance of the study is due to the need for a systemic analysis of burnout factors in the post-crisis period, when teachers faced a combination of traditional stressors and new challenges, such as hybrid learning. The purpose of the study is to identify stable and situational determinants of burnout using an interdisciplinary approach (labor psychology, sociology of education, economics).

The problem of professional burnout of teachers has become increasingly relevant in recent years. Numerous studies and practical observations indicate that this phenomenon is formed under the influence of a number of interrelated reasons. Understanding them allows us to develop effective measures to support teaching staff.

The daily work of a teacher is connected with intensive emotional interaction. Constant contact with children of different ages and temperaments, the need to react to conflict situations, interaction with parents who have different expectations from the educational process - all this creates chronic tension. Working with children from disadvantaged families, where the teacher has to compensate for the lack of family upbringing, becomes especially difficult.

Real practice shows that teachers' working hours have long gone beyond the established standards. Preparing for lessons in the context of constantly changing programs, checking notebooks in large classes, filling out numerous reporting documents - these duties are often performed outside of working hours. As a result, teachers have virtually no opportunity for proper rest and recovery.

Many teachers note the lack of effective assistance from the administration of educational institutions. A formal approach to work assessment, a lack of constructive feedback, and inattention to professional difficulties create a feeling of uselessness and undervaluation among teachers. In such conditions, even the most dedicated specialists gradually lose motivation.

Teaching activity by its nature refers to professions of the "person-to-person" system, which presupposes intensive emotional costs. Modern research emphasizes the role of emotional labor, which requires constant self-control. The teacher is forced to:

- Regulate your own emotions in conflict situations (for example, when interacting with aggressive parents);

- Convey a positive attitude even when you are internally exhausted;
- Empathically engage in students' problems, which is especially true when working in classes with children from risk groups.

Experimental data confirm that 43% of teachers working in inclusive schools have burnout levels that exceed the clinically significant threshold [5]. The COVID-19 pandemic has exacerbated this trend: the transition to distance learning has increased emotional stress by 27% due to the need to simultaneously master new technologies and maintain student engagement [9].

The paradox of the modern school is the contradiction between the declared focus on the quality of teaching and the growth of the administrative workload. Teachers spend up to 40% of their working time filling out reports, drawing up plans and preparing for inspections. In Russia, according to monitoring by the National Research University Higher School of Economics (2023), this figure is even higher - 52%, which is due to excessive regulation [3].

Ryan and Deci's self-determination theory [10] explains burnout by blocking basic needs for competence and autonomy. Strict methodological prescriptions, lack of opportunity to influence curricula, and low evaluation of work by the administration form the syndrome of "futile effort" [11]. For example, in countries with a high level of centralization of education (France, Russia), the index of professional satisfaction of teachers is 15–20% lower than in systems with developed school autonomy (Finland, Canada) [9].

Despite the formal increase in salaries (in Russia, a nominal increase of 12% in 2023), teachers' real incomes remain below the average for the economy [3]. This creates the effect of "double employment", 38% of teachers are forced to combine work with part-time jobs, which accelerates exhaustion [3].

The media narrative that emphasizes the "easiness" of teaching and its low prestige increases cognitive dissonance among teachers. Sociological surveys record that 61% of Russian teachers feel undervalued by society [3], which correlates with the growth of depersonalization – a key component of burnout according to the Maslach model.

Psychological studies reveal unobvious patterns: teachers with a high level of idealism (expecting "perfect" results from students) are subject to burnout 2.3 times more often than their more pragmatic colleagues. However, individual coping strategies can neutralize external stressors. For example, mindfulness practices reduce the level of emotional exhaustion by 34% in 6 months [2].

A pilot experiment conducted in April 2025 to assess the level of emotional exhaustion among teachers in Moscow schools is of particular interest in the context of the discussion of professional burnout. As noted by N.V. Kolesnik and S.I. Boyarkina (2024), the post-pandemic period is characterized by accumulated stress in teaching staff, which requires regular monitoring of their psycho-emo-

tional state [9]. This study complements existing data on the problem of burnout, focusing on the specifics of the Moscow educational space with its increased demands on teachers.

The study involved 32 teachers (average experience – 15 years, (25 women and 7 men) from two comprehensive schools. Participants were selected by random sampling, observing the principle of voluntariness. For diagnostics, the Russian-language version of the professional burnout questionnaire (Maslach Burnout Inventor – MBI) by K. Maslach and S. Jackson (C. Maslah, SE Jackson, 1981), adapted by N.E. Vodopyanova [1] was used.

The results showed that a high level of emotional exhaustion was recorded in 15 teachers (47%). The average score on the scale was 27.3 ± 4.1 with a clinically significant threshold of 25 points. Moderate signs of depersonalization (34% of cases) were manifested mainly in formal, impersonal interactions with students (“I stopped seeing them as individuals, only academic performance” - from the respondents’ comments).

A decrease in professional effectiveness indicators was found in 28% of teachers and correlated with a high workload (more than 30 hours/week).

Data processing was carried out using correlation analysis (Pearson’s method) and statistical data analysis SPSS 26.0. Direct correlation between the number of administrative duties and the level of emotional exhaustion ($r=0.62$, $p<0.05$). Inverse relationship between length of service and depersonalization ($r=-0.41$, $p<0.05$). 72% of teachers with a workload of over 28 hours demonstrated clinical signs of burnout

Qualitative analysis revealed important nuances: teachers over 45 years of age more often noted physical fatigue. Young specialists (up to 5 years of experience) emphasized emotional devastation. It is interesting to note that class teachers showed 15% higher scores on the exhaustion scale.

The data obtained confirm the hypothesis about the growing problem of burnout in the capital’s schools. The high percentage of emotional exhaustion (47%) requires special attention.

Of interest is also the identified “experience paradox”: more experienced teachers demonstrate better resistance to depersonalization, which is consistent with the concept of professional resilience, but their physical exhaustion indicates a cumulative effect of stress. The findings are consistent with the results of other studies confirming that teachers are at high risk of burnout, especially in the context of educational reform and increased workload.

Thus, the analysis demonstrates the polycasuality of professional burnout of teachers, where systemic (organizational, economic) and individual factors mutually reinforce each other. For effective prevention, it is necessary to de-bureaucratize the educational process, introduce psychological support programs and revise

the social contract with teachers (status, remuneration). A promising direction seems to be the study of “buffering” factors - for example, the role of school climate or mentoring in reducing stress.

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碳水化合物源对耐冷酵母红酵母、掷孢酵母和囊担子酵母合成类胡萝卜素色素的影响

**EFFECT OF CARBOHYDRATE SOURCE ON THE SYNTHESIS OF
CAROTENOID PIGMENTS BY PSYCHROTOLERANT YEASTS
RHODOTORULA, *SPOROBOLOMYCES*
AND *CYSTOBASIDIUM***

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摘要: 从东南极洲土壤样品中分离的耐冷酵母能够合成各种比例的色素复合物, 包括圆胡萝卜素、圆胡萝卜素、 ζ -胡萝卜素、 γ -胡萝卜素和 δ -胡萝卜素。红酵母属的代表菌株主要合成 ζ -胡萝卜素和圆胡萝卜素/圆胡萝卜素复合物; 孢囊酵母属的代表菌株在果糖、麦芽糖和蔗糖上生长时, 主要合成圆胡萝卜素和 ζ -胡萝卜素复合物; 囊担子酵母属的代表菌株仅能合成 δ -胡萝卜素和 ζ -胡萝卜素复合物。根据所得结果, 碳水化合物来源影响南极酵母菌株合成色素的数量和光谱。当合成色素的比例发生变化时, 会形成不同颜色的色素。

关键词: 类胡萝卜素、酵母、分光光度法、色素鉴定、torulen、torularhodin、胡萝卜素。

Abstract. Psychrotolerant yeasts isolated from soil samples of East Antarctica are capable of synthesizing pigment complexes including torulene, torularhodin, ζ -carotene, γ -carotene, and δ -carotene in various ratios. Representatives of the genus *Rhodotorula* predominantly synthesize pigment complexes including ζ -carotene and torularhodin/torulene, *Sporobolomyces* are capable of synthesizing predominantly the torulene and ζ -carotene complex when grown on fructose, maltose, and sucrose. Representatives of the genus *Cystobasidium* are capable of synthesizing only the δ -carotene and ζ -carotene complex. According to the results obtained, the carbohydrate source affects the amount and spectrum of pigments synthesized by Antarctic yeast strains. When the ratio of synthesized pigments changes, pigments of different colors are formed.

Keywords: carotenoids, yeast, spectrophotometry, pigment identification, torulen, torularhodin, carotene.

Introduction

Carotenoids are the most widespread pigments in nature. They are divided into two groups: carotenes (α -carotene, β -carotene, γ -carotene, torulene, etc.) — mainly consisting of hydrocarbons, and xanthophylls (astaxanthin, lutein, zeaxanthin, β -cryptoxanthin, fucoxanthin and canthaxanthin) — molecules consisting of carbon, hydrogen and oxygen [11]. Carotenoids are derived from tetraterpenoids, with conjugated double bonds that absorb light in the 400–500 nm range and are therefore responsible for the color characteristics of the molecule. Carotenoids currently constitute the largest and most diverse known group of natural pigments, with 1204 carotenoid structures collected from 722 organismal sources. They combine with membrane lipids to protect yeast cells from radiation and oxidation [11, 15].

Strains belonging to the genera *Rhodotorula*, *Sporobolomyces* and *Rhodospiridium* are capable of synthesizing the β -carotene, torulene and torularhodin (Figure 1). Due to their health-promoting properties (antimicrobial, antitumor), these carotenoids are widely used in the cosmetic, pharmaceutical and food industries [6]. The biological functions of torulene include provitamin A activity — 50% of the activity of all trans- β -carotene and antitumor activity (it causes apoptosis at moderate cytotoxic concentrations in both androgen-sensitive and -insensitive prostate cancer cell lines) [16]. Torularhodin has a higher efficiency in absorbing peroxide radicals than β -carotene due to two additional conjugated double bonds. Torularhodin has strong antimicrobial properties and may become a new natural antibiotic [9].

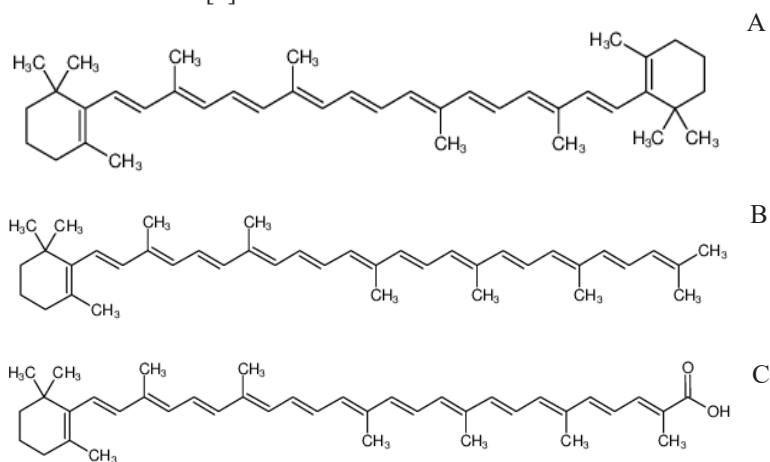


Figure 1. Structural formulas of β -carotene (A) [29], torulene (B) [4] and torularhodine (C) [29]

The aim of this study was to determine the effect of carbon source on the synthesis of carotenoid pigments by psychrotolerant yeast.

Materials and methods

Yeast cultures and their maintenance. *Rhodotorula glutinis* BIM Y-375, *Rh. glutinis* BIM Y-376, *Rh. glutinis* BIM Y-369, *Sporobolomyces phaffii* BIM Y-378, *Sp. phaffii* BIM Y-367, *Sp. phaffii* BIM Y-374, *Sp. phaffii* BIM Y-370, *Sp. phaffii* BIM Y-371, *Sp. phaffii* BIM Y-372, *Cystobasidium ritchiei* BIM Y-366, *C. ritchiei* BIM Y-368, isolated and characterized [2] from fine earth samples (hypoliths and endoliths) from East Antarctica, collected in the territory of Enderby Land, Molodezhnaya station, Vechernyaya Mountain field base, and the Prince Charles Mountains. The samples were collected in the period from 2015 to 2017 as part of the Belarusian Antarctic expeditions. Yeast cultures were maintained on Sabouraud agar (Federal State Scientific Center for Applied Microbiology and Biotechnology “Nutrient Medium No. 2 GRM (SABURO)”) at 18 °C/3–5 days.

Identification and deposition. Systematic identification of Antarctic yeast cultures was carried out by determining the nucleotide sequences of 18S rRNA gene fragments by Sanger sequencing using NS1 and NS4 primers [1]. Molecular DNA identification was performed by comparing the obtained sequences of 18S rRNA gene fragments with records of the GenBank database “TL/18S_fungal_sequences” (BioProject PRJNA39195) using the BLAST program on the server of the National Center for Biotechnology Information [3]. Psychrotolerant yeasts were deposited in the scientific collection of type and industrially valuable strains of microorganisms of the Institute of Microbiology of the National Academy of Sciences of Belarus [3].

Pigment production media. Yeasts were inoculated into Sabouraud broth medium at 18 °C with aeration of 140 rpm for 5 days. The effect of carbon sources (glucose, fructose, maltose, sucrose – 4%) on the composition and synthesis of pigments was studied.

Extraction of pigments. Extraction of intracellular pigments was carried out using the acid method [4]. Pigments were extracted with 96% ethyl alcohol.

Spectrophotometric analysis of carotenoids and assessment of their production level. Analysis of synthesized carotenoid pigments was carried out based on absorption measurements in the visible wavelength range using a Solar PV 1251C spectrophotometer. The amount of pigments was determined by measuring the absorption maximum and using the Kelly and Harmon equation [7, 12].

Results and discussion

To identify the produced pigments and ensure maximum yield of yeast cell biomass, all grown biomass was separated from the culture liquid, washed and subjected to pigment composition studies.

The spectra of yeast pigment fractions showed the presence of three characteristic absorption peaks, which is typical for carotenoids. Information on absorption maxima (Table 1) allowed the use of spectrophotometric analysis to identify the studied pigments [7, 8, 13].

The absorption maxima in the spectra of carotenoids of the studied microbial group demonstrate heterogeneity, which indicates the synthesis of complexes of various common pigments by the studied yeast strains (Table 2).

Table 1.

Maximum absorption values of pigments isolated from Antarctic yeasts [10]

pigments	Maximum wavelength (nm)*		$E_{1\%}^{1\text{cm}}$
	Literary meaning	Experimental significance	
ζ- carotene	399	398; 399	2500
γ- carotene	460	460	2760
β- carotene	451	451; 453	2500
δ- carotene	456	456	3290
torulene	484	482; 485	2680
torularhodin	492, 515	491	1932

Note: “*” – all determinations were carried out in ethyl alcohol.

According to the obtained results of spectrophotometric identification of pigments, representatives of the genus *Rhodotorula* are capable of synthesizing either a complex of ζ-carotene and torulene, or a complex of ζ-carotene and torularhodin. With an equal ratio of ζ-carotene and torulene/torularhodin, a coral coloration is formed. With an increase in the concentration of torulene/torularhodin by 1.5–2.4 times, pink pigmentation of the colonies is formed. With an increase in the concentration of torulene/torularhodin by 3 times compared to the concentration of ζ-carotene, light pink pigmentation of the colonies is formed (Figure 2). It should be noted that the highest yield of pigments was observed with the addition of maltose (in *Rh. glutinis* BIM Y-375, *Rh. glutinis* BIM Y-376) and fructose (in *Rh. glutinis* BIM Y-369) to the nutrient medium.

Representatives of the genus *Sporobolomyces* are able to synthesize predominantly the torularhodin and ζ-carotene complex when grown on fructose, maltose and sucrose (with the exception of *Sp. phaffii* BIM Y-374, which formed the torularhodin and ζ-carotene complex when grown on sucrose). When grown on glucose, *Sp. phaffii* BIM Y-378 and *Sp. phaffii* BIM Y-372 formed the β-carotene and ζ-carotene complex, while *Sp. phaffii* BIM Y-370 and *Sp. phaffii* BIM Y-371 formed the γ-carotene and ζ-carotene complex. A visual change in the color of the synthesized pigment was observed with an increase in ζ-carotene synthesis by 2.13–4.2 times (in *Sp. phaffii* BIM Y-372 when grown on fructose, maltose,

and sucrose; in *Sp. phaffii* BIM Y-374 when grown on sucrose), which led to the formation of a light pink pigment. At the same time, an increase in the torulene/torularhodin concentration by 1.6–2.3 times, as shown mainly in *Sp. phaffii* BIM Y-378 and *Sp. phaffii* BIM Y-367, leads to the formation of a coral-red pigment. An equal ratio of synthesized pigments contributed to the formation of a coral-colored pigment in the cells (Figure 2). The highest yield of pigments was observed during growth on sucrose (in *Sp. phaffii* BIM Y-378, *Sp. phaffii* BIM Y-367, *Sp. phaffii* BIM Y-374) and on glucose (in *Sp. phaffii* BIM Y-370, *Sp. phaffii* BIM Y-371).

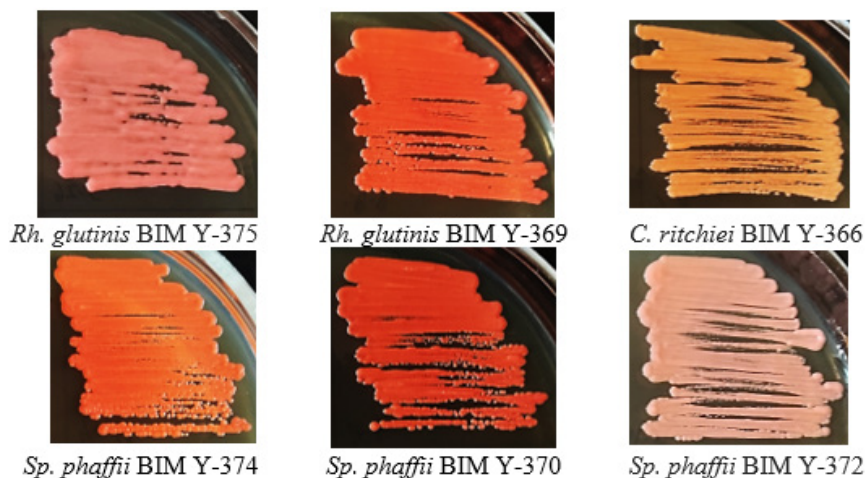


Figure 2. Yeast growth on Sabouraud medium with glucose

Table 2.
Effect of carbon sources on the synthesis of carotenoid pigments

strains	glucose			fructose			maltose			sucrose		
	pigments	C		pigments	C		pigments	C		pigments	C	
		µg/g	%		µg/g	%		µg/g	%		µg/g	%
<i>Rh. glutinis</i> BIM Y-375	ζ-carotene	21,4	38,4	ζ-carotene	93,1	39,2	ζ-carotene	102,7	24,1	ζ-carotene	65,5	26,1
	torularhodin	34,3	61,6	torularhodin	144,3	60,8	torularhodin	322,9	75,9	torularhodin	185,9	73,9
<i>Rh. glutinis</i> BIM Y-376	ζ-carotene	62,9	26,2	ζ-carotene	83,6	39,4	ζ-carotene	96,4	30,9	ζ-carotene	145,2	48,1
	torularhodin	177,3	73,8	torulene	128,4	60,6	torulene	215,3	69,1	torulene	156,7	51,9
<i>Rh. glutinis</i> BIM Y-369	ζ-carotene	77,8	35,8	ζ-carotene	143,1	49,8	ζ-carotene	69,2	34,6	ζ-carotene	68,0	29,4
	torulene	139,8	64,2	torulene	144,1	50,2	torulene	130,7	65,4	torulene	163,4	70,6
<i>Sp. phaffii</i> BIM Y-378	ζ-carotene	64,2	39,2	ζ-carotene	89,2	37,6	ζ-carotene	110,7	43,9	ζ-carotene	112,2	38,7
	β-carotene	99,5	60,8	torulene	148,1	62,4	torulene	141,6	56,1	torulene	177,5	61,3
<i>Sp. phaffii</i> BIM Y-367	ζ-carotene	71,0	38,3	ζ-carotene	113,4	30,1	ζ-carotene	116,2	47,6	ζ-carotene	169,4	35,5
	torulene	114,2	61,7	torulene	263,9	69,9	torulene	128,1	52,4	torulene	307,3	64,5
<i>Sp. phaffii</i> BIM Y-374	ζ-carotene	119,3	37,5	ζ-carotene	163,5	51,0	ζ-carotene	119,2	51,7	ζ-carotene	262,7	80,3
	torulene	199,0	62,5	torulene	157,2	49,0	torulene	111,5	48,3	torularhodin	64,4	19,7
<i>Sp. phaffii</i> BIM Y-370	ζ-carotene	108,3	46,9	ζ-carotene	93,1	46,2	ζ-carotene	42,9	50,1	ζ-carotene	43,1	39,4
	γ-carotene	122,6	53,1	torulene	108,2	53,8	torulene	42,7	49,9	torulene	66,3	60,6
<i>Sp. phaffii</i> BIM Y-371	ζ-carotene	84,8	41,4	ζ-carotene	48,9	54,1	ζ-carotene	31,4	48,4	ζ-carotene	65,1	56,1
	γ-carotene	119,8	58,6	torulene	41,5	45,9	torulene	33,5	51,6	torulene	50,9	43,9
<i>Sp. phaffii</i> BIM Y-372	ζ-carotene	44,2	56,4	ζ-carotene	122,4	80,8	ζ-carotene	83,8	68,0	ζ-carotene	79,3	76,5
	β-carotene	34,1	43,6	torulene	29,0	19,2	torulene	39,4	32,0	torulene	24,3	23,5
<i>C. richiei</i> BIM Y-366	ζ-carotene	35,3	43,9	ζ-carotene	133,2	58,5	ζ-carotene	117,2	57,6	ζ-carotene	36,8	58,2
	δ-carotene	45,2	56,1	δ-carotene	94,6	41,5	δ-carotene	86,1	42,4	δ-carotene	26,4	41,8
<i>C. richiei</i> BIM Y-368	ζ-carotene	74,4	53,8	ζ-carotene	133,6	62,4	ζ-carotene	108,8	56,9	ζ-carotene	46,7	54,2
	δ-carotene	63,8	46,2	δ-carotene	80,6	37,6	δ-carotene	82,5	43,1	δ-carotene	39,5	45,8

Note: "C" is the pigment concentration, "µg/g" is the ratio of synthesized pigments, expressed as a percentage.

Representatives of the genus *Cystobasidium* are capable of synthesizing only the δ -carotene complex and ζ -carotene when grown on the indicated carbohydrates in approximately equal concentrations, with a slight bias towards ζ -carotene, which led to the formation of an orange pigment (Figure 2). The highest yield of pigments was observed when grown on fructose.

During the study, the highest yield of ζ -carotene was 262.7 $\mu\text{g/g}$ in *Sp. phaffii* BIM Y-374 (on sucrose), torulene – 307.3 $\mu\text{g/g}$ in *Sp. phaffii* BIM Y-367 (on sucrose), torularhodin – 322.9 $\mu\text{g/g}$ in *Rh. glutinis* BIM Y-375 (on maltose), γ -carotene – 122.6 $\mu\text{g/g}$ in *Sp. phaffii* BIM Y-370 (on glucose), δ -carotene – 94.6 $\mu\text{g/g}$ in *C. ritchiei* BIM Y-366 (on fructose).

Conclusion

Selective absorption of light in the visible spectrum is an important diagnostic tool for the identification of carotenoids using UV-visible spectrophotometry. Variability in the synthesis of various pigment complexes may be associated with the high lability of terpenoid compounds, which affects their absorption characteristics. In turn, psychrotolerant yeast isolated from soil samples of East Antarctica are capable of synthesizing pigment complexes including torulene, torularhodin, ζ -carotene, γ -carotene and δ -carotene in various ratios, which leads to the formation of coral-red, light pink or orange pigments. According to research, representatives of the genus *Rhodotorula* predominantly synthesize pigment complexes including ζ -carotene and torularhodin/torulene. Representatives of the genus *Sporobolomyces* are able to synthesize mainly the torulene and ζ -carotene complex when grown on fructose, maltose and sucrose. Representatives of the genus *Cystobasidium* are able to synthesize only the δ -carotene and ζ -carotene complex.

According to the obtained results, the carbohydrate source affects the quantity and spectrum of pigments synthesized by Antarctic yeast strains. When the ratio of synthesized pigments changes, pigments of different colors are formed.

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区域药房组织青霉素类药物范围分析

**ANALYSIS OF THE RANGE OF PENICILLIN DRUGS IN A
PHARMACY ORGANIZATION AT THE REGIONAL LEVEL**

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摘要: 向民众提供药品的质量直接取决于医药市场的状况和发展。以某区域性药房组织为例,对其青霉素类抗菌药物产品系列进行了市场分析。结果表明,该组织的产品系列完整性和深度指标较低,但合理性较高,并据此提出了优化其产品政策的措施。

关键词: 药品, 市场分析, 医药市场, 药房组织。

Abstract. *The quality of drug provision to the population directly depends on the state and development of the pharmaceutical market. A marketing analysis of the product range of penicillin antibacterial drugs was conducted using the example of one of the regional pharmacy organizations. Low indicators of the completeness and depth of the range with a high degree of rationality were revealed, in connection with which measures were proposed to optimize the product policy of this organization.*

Keywords: *drug, marketing analysis, pharmaceutical market, pharmacy organization.*

Currently, the pharmaceutical market of the Russian Federation is in conditions of geopolitical instability. The economic pressure exerted can lead to a decrease in imports of not only drugs (MP), but also pharmaceutical substances and excipients, which turns out to be a significant factor influencing the quality of drug provision to the population [4]. Of particular importance is the timely delivery of vital MP to patients, one of which is antibacterial [2]. The aim of the study was to assess the rationality of the range of penicillin drugs using the example of one of the regional pharmacy organizations (PO) in Voronezh.

Materials and methods

The product range was studied and marketing indicators of the range of penicillin drugs for the studied PO for April 2025 were calculated. The volume of drug sales in physical terms was determined. The PO for the study was selected based on the following criteria: belonging to a large federal pharmacy chain, close proximity to a medical organization. Calculations were made using Microsoft Office Excel software. Results and discussions

According to the pharmacological classification of the Russian medicine register [3], the product range of penicillin antibiotics in the studied JSC is represented by the following pharmacological groups (PG):

- penicillins – 14 drugs;
- amoxicillin – 13 drugs (6 trade names (TN));
- ampicillin – 1 drug (1 TN);
- penicillins in combinations – 21 drugs:
- amoxicillin + clavulanic acid – 18 drugs (7 TN);
- benzathine benzylpenicillin + benzylpenicillin sodium + benzylpenicillin procaine – 2 drugs (1 TN);
- benzathine benzylpenicillin + benzylpenicillin procaine – 1 drug (1 TN).

71.4% monodrugs are domestic and are produced by PJSC Sintez, OJSC Biokhimik, JSC AVVA RUS, CJSC LEKKO, JSC Usolye-Sibirsky Khimpharmzavod.

Among combined penicillins, 47.6% of drugs are produced by Russian manufacturers (PJSC Sintez, CJSC LEKKO, JSC AVVA RUS).

To calculate the marketing indicators of the range of the studied JSC, an analysis of the State Register of Medicines (GRLS) [1] was conducted as of 21.04.2025. It was revealed that a total of 126 drugs of the FG “Penicillins” and 228 drugs of the FG “Penicillins in combinations” are registered in the Russian Federation, each of the groups is represented by 11 different dosage forms (DF).

In the assortment of the studied JSC, the penicillin group is represented only by dosage forms for enteral use (tablets; film-coated tablets; dispersible tablets). The presence of different types of dosage forms in the assortment is characterized by the coefficient of completeness (CC), equal to the ratio of the number of dosage forms of one FG available in the JSC to the number of dosage forms of the same FG registered in the State Register of Medicines. $CC = 27\% (3/11 \cdot 100\%)$.

Combined penicillins are represented by both enteral forms (film-coated tablets; dispersible tablets; powder for preparation of oral suspension; granules for preparation of oral suspension) and parenteral forms (powder for preparation of solution for intravenous administration; powder for preparation of suspension for intramuscular administration).

$CC = 55\% (6/11 \cdot 100\%)$. To assess the ability of the analyzed product range to satisfy alternative demand, the value of the depth coefficient (DC) was calculated, which is the ratio of the number of drug names of one FG available in the

JSC to the number of drug names of the same FG registered in the State Register of Medicines. A low DC was found both in the group of monodrugs - 11% ($14/126 \cdot 100\%$), and among penicillins in combinations - 9% ($21/228 \cdot 100\%$). The rationality of the JSC product range was determined by calculating the degree of its use (the share of drugs in demand in the analyzed period): $34/35 = 97.1\%$ (see Fig. 1). The obtained value indicates the absence of illiquid drugs in the penicillin group product range.

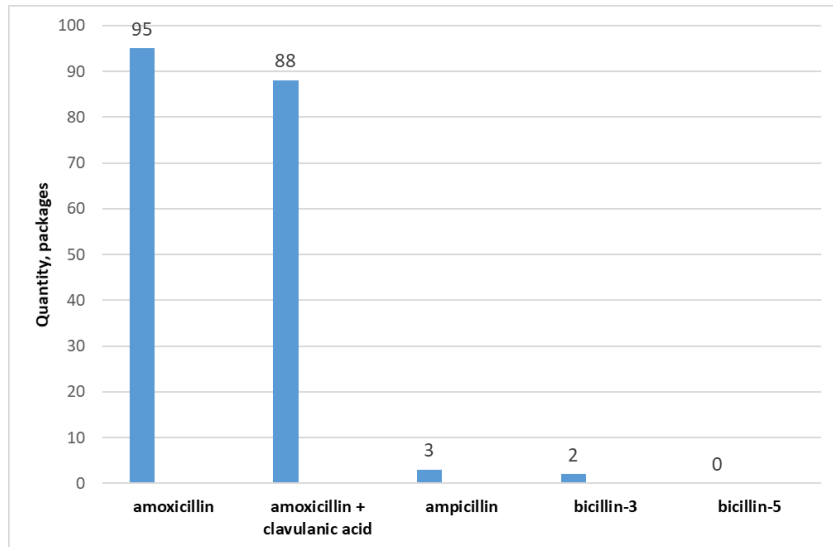


Figure 1. Analysis of demand for penicillin drugs in the studied pharmacy organization

The highest sales volume is noted for amoxicillin drugs (Flemoxin Solutab, Amoxicillin-AKOS) and amoxicillin in combination with clavulanic acid (Amoxiclav, Amoxicillin + Clavulanic acid EXPRESS).

Conclusions

The calculated marketing indicators characterize the range of penicillin drugs in the Voronezh JSC as insufficient. Thus, the average value of the CP for the groups “Penicillins” and “Penicillins in combinations” is 46.5%, and KG - only 10%.

In order to optimize the assortment policy and improve the quality of pharmaceutical services provided, it seems advisable to work in the following areas (using the example of the studied JSC):

- expansion of the range of penicillins in the JSC by introducing a larger number of different drugs into the nomenclature list;
- purchasing drugs in dosages that help meet the needs of various age groups of buyers;
- creating a safety stock of drugs and registering unmet demand;
- improving the level of skills in pharmaceutical consulting of the population when dispensing drugs.

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耶尔森氏菌属细菌引起的疾病

DISEASES CAUSED BY BACTERIA OF THE GENUS YERSINIA

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摘要: 本文探讨了耶尔森菌属中导致人类和动物疾病的主要病原体。重点关注具有致病因素的小肠结肠炎耶尔森菌样菌的作用。这类细菌可能引起人类和动物的疾病,然而,这些疾病的典型症状却截然不同。为了快速鉴定耶尔森菌,建议使用分子遗传学和光谱分析方法。

关键词: 耶尔森菌、鼠疫、假结核病、耶尔森菌病、致病因素、鼠疫耶尔森菌、假结核耶尔森菌、小肠结肠炎耶尔森菌、小肠结肠炎耶尔森菌样菌。

Abstract. *The main pathogens of human and animal diseases included in the genus Yersinia are considered. Emphasis is placed on the role of Y. enterocolitica-like bacteria possessing pathogenicity factors. Potentially, the latter bacteria can cause diseases of humans and animals, however, the clear symptoms of these diseases are extremely contradictory. For rapid identification of Yersinia, it is recommended to use molecular genetic and spectral methods of analysis*

Keywords: *Yersinia, plague, pseudotuberculosis, yersiniosis, pathogenicity factors, Y. pestis, Y. pseudotuberculosis, Y. enterocolitica, Y. enterocolitica-like.*

The aim of this study was to study the etiology of diseases caused by Yersinia based on literature data and our own research, focusing on the role of *Y. enterocolitica-like bacteria*.

The genus *Yersinia* belongs to the recently isolated family Yersiniaceae [5]. This genus includes three known pathogens of humans and animals: *Yersinia pestis* (the causative agent of plague), *Yersinia pseudotuberculosis* (the causative agent of pseudotuberculosis) and *Yersinia enterocolitica* (biotypes 1B, 2, 3, 4 and 5) – the causative agent of intestinal yersiniosis, as well as a large number of *Yersinia* with controversial pathogenicity – the so-called *Y. enterocolitica*-like microbes.

The zoonotic obligate pathogen *Y. pestis* is the causative agent of plague – a systemic disease that usually leads to death if left untreated. It is known that this species is a clone of *Y. pseudotuberculosis*. Both species are genetically almost identical. The transition of *Y. pseudotuberculosis* to *Y. pestis* was accompanied by the loss of many and the acquisition of several genes by this microbe [10,15]. *Y. pseudotuberculosis* causes a disease previously described as FESLF (Far East scarlet fever-like fever), currently the term pseudotuberculosis is used, but not yersiniosis [2,14]. *Y. enterocolitica* is the causative agent of intestinal yersiniosis, a systemic disease of the gastrointestinal tract. Of particular interest are the so-called *Y. enterocolitica*-like bacteria. The latter include: *Y. kristensenii*, *Y. intermedia*, *Y. frederiksenii*, *Y. hibernica*, *Y. ruckeri* and a number of others. When using traditional methods of phenotypic identification, these bacteria are difficult to differentiate from *Y. enterocolitica* due to their similarity. The causative agent of infection in salmon fish is *Y. ruckeri*, leading to their mass death in artificially raised conditions [22]. *Y. entomophaga* causes an infectious disease in the New Zealand grass larva *Costelytra zealandica* [13,19]. According to our numerous observations since the 1990s, a change in the etiologically significant pathogens of yersiniosis infections has been noted in the North-West of Russia: instead of *Y. pseudotuberculosis*, the following species are beginning to predominate - *Y. enterocolitica*, *Y. kristensenii*, *Y. intermedia*, *Y. mollaretii*, *Y. frederiksenii*. Previously, in the structure of yersiniosis cases, outbreaks of pseudotuberculosis were recorded, and the incidence of intestinal yersiniosis was an order of magnitude lower. Since the 1990s, against the background of a decrease in the sowing of *Y. pseudotuberculosis* and *Y. enterocolitica* from environmental objects and field material, an increase in the sowing of *Y. kristensenii* has been noted. In addition, other opportunistic yersinia are distinguished: *Y. intermedia*, *Y. frederiksenii*, and in the last decade – *Y. mollaretii*.

In strains of *Y. pseudotuberculosis*, *Y. enterocolitica* biovars IA, 2, 3, 4, and *Y. kristensenii*, isolated from sick people, contacts, and from environmental objects, chromosomal and plasmid virulence genes, as well as phenotypic pathogenicity markers, were identified. Apparently, they determine the clinical course of yersiniosis. Probably, the same fate awaits closely related species of *Y. enterocolitica*-like, because back in the 60s of the 20th century, *Y. enterocolitica* was considered non-pathogenic [1,3].

In third place in the number of isolated strains of yersinia is *Y. kristensenii*. Despite the detection of these Yersinia in four patients with intestinal infections, it is impossible to speak about the etiological role of these bacteria in these individuals, since a full range of bacteriological and virological studies excluding other etiological agents was not carried out.

The fact that *Y. enterocolitica*-like bacteria were isolated from 22 carriers and 111 strains were found in environmental objects is alarming, which shows their active circulation. The presence of the *ykstB* gene in 16 strains indicates that these Yersinia have pathogenic potential and a relatively complex genetic structure [1].

There are more and more reports in the literature on the isolation of *Y. enterocolitica*-like microbes not only from patients with intestinal infections, but also in other pathological processes. Unfortunately, these Yersinia are not studied as a possible etiologic factor. Therefore, it is so important to study the pathogenicity factors of rarely isolated Yersinia. In recent years, certain types of Yersinia with pathogenicity determinants have been increasingly isolated. Most often, these types include the “troika” of Yersinia: *Y. kristensenii*, *Y. intermedia*, *Y. frederiksenii*. The clinical significance of these Yersinia remains unclear and will be clarified as a result of improving etiologic diagnostics. *Y. ruckeri* is an intestinal pathogen for salmon fish and some insects. However, *Y. ruckeri* has been isolated from human wound discharge after an injury sustained while swimming. This is an absolute pathogen for fish, however, people eat fish not only in thermally processed but also raw form, so the question arises about the possible etiological significance of these Yersinia. *Y. ruckeri* have pathogenicity factors, have the ability to form biofilms [3,12]. Hemolysin *Y. ruckeri* YhlA is able to lyse erythrocytes. Metalloprotease Yrp1 is involved in colonization and invasion of tissues, destroys fibronectin, actin and myosin. The type III secretion system (T3SS) promotes the survival of bacteria in macrophages. A characteristic feature of *Y. ruckeri* is the absence of the urease enzyme, as a result of which the colonies on elective nutrient media were not stained blue-green, as in other Yersinia [18]. Further studies using the MALDI ToFMS method and determination of biochemical activity using the API 20E test system showed that the bacteria belong to the species *Y. ruckeri*. As an additional method for determining the genus and species affiliation of the studied strain, sequencing of the 16S rRNA gene was used.

The pathogenicity factors of *Y. kristensenii* include the genes of siderophores of the enterobactin, petribactin and aerobactin clusters, the genes of type 6 secretion proteins, type 4 pili, the genes of hemolysins of the ShlB/FhaC/HecB family and phospholipase C, the virulence gene that ensures damage to the intestinal epithelial cells of animals (invasin, *inv.*). This also includes the *ytx* enterotoxin gene, similar to the pertactin of *Bordetella pertussis*, and finally the genes for resistance to quinolones (QnrB10) and macrolides (MFS, MacA, MacB), and the class C

serine beta-lactamase gene [7]. The *ykst* gene has also been identified in 4 strains of *Y. kristensenii* [4,6]. The only bacterial isolate of *Y. kristensenii* (EPLC-04T) was isolated from human feces and identified based on phenotypic characteristics, mass spectrometry, and partial sequencing of the 16S rRNA gene. The phenotypic profile of the isolate differed from that described for the most closely related species, *Y. kristensenii*, by increased lipase production and the absence of pyrazinamidase activity. However, unique phenotypic features and phylogenetic analysis results indicate that it represents a new subspecies of *Y. kristensenii*. The subspecies *rochesterensis* subsp. nov. (strain type EPLC-04T=ATCC BAA-2637T, DSMZ 28595T) is proposed for this new taxon [6,9]. Using a matrix-assisted laser desorption ionization time-of-flight mass spectrometer (MALDI-TOF MS), we identified a rare species, *Y. aleksiciae*, which does not differ from *Y. kristensenii* in known biochemical properties. This deposited strain is proposed as a test system for the identification of *Yersinia*. *Y. aldovae* (like other bacteria of the genus *Yersinia*) has a number of pathogenicity factors that ensure interaction with the epithelium, overcoming the body's anti-infective defense mechanisms and the release of toxins. This includes the surface proteins Yop, enterotoxin, which promotes the development of secretory diarrhea. Plus proteins of the outer membrane (invasin, Ail protein). The pYV plasmid has also been identified. Highly virulent strains of *Y. aldovae* (biovar 1B) have additional pathogenicity factors: a system for transporting iron into the microbial cell and superoxide dismutase, which makes the cell resistant to phagocytosis [13].

Y. intermedia has a number of pathogenicity factors that ensure adhesion and colonization, as well as toxin formation. These properties are determined by chromosomal and plasmid genes. Adhesins YadA (*Yersinia* adhesin A), toxic products secreted by *Y. intermedia* (enterotoxin, LPS complex (endotoxin), yersiniabactin) were detected. The study of the expression of *Y. intermedia* virulence genes showed that the RovA protein regulates the activity of pathogenicity factors depending on the ambient temperature. A comparative study of the pore-forming activity of porins showed that in the "cold" variants of *Y. intermedia*, the polypeptide cross-reacting with yersinin is in the oligomeric form, and in the "warm" ones - in the form of [8] monomers. Pathogenicity factors of *Y. mollaretii* include plasmids, toxins and secretion systems that ensure the interaction of the bacterium with the host organism. *Y. mollaretii*, like other species of *Yersinia*, contains plasmids that control pathogenicity factors (PYV plasmid). Genome study *Y. mollaretii* allowed us to discover the *bla*YEM gene encoding the metallo- β -lactamase YEM-1. This enzyme has a narrow substrate spectrum: it can hydrolyze only imipenem, but not other carbapenems [16].

Pathogenicity factors of *Y. frederiksenii* include genetic determinants that determine the ability of the microorganism to cause diseases, as well as the

mechanisms of action of these factors. These include the type VI secretion system (T6SS), the *yacT* gene encoding a protein similar to the enterotoxin (Ast) of *Aeromonas hydrophila*. Analysis of the *Y. frederiksenii* genome showed similarity to the genomes of other *Yersinia* species, including virulence genes. A mutant of *Y. frederiksenii* lacking the *yacT* gene showed reduced pathogenicity towards *G. mellonella* larvae [24]

A case of isolation of *Y. canariae* is described from clinical material in Denmark [17,20]. *Y. artesisana*, *Y. proxima*, *Y. alsatica*, *Y. vastinensis*, *Y. thracica* and *Y. occitanica* have been isolated from humans, animals and food products by multilocus typing of the core genome sequence [11,21]. For economic reasons, only a few microbiology laboratories perform tests to differentiate *Y. enterocolitica* from *Y. enterocolitica*-like bacteria; therefore, some *Y. enterocolitica*-like species are likely to be misidentified. In this context, it has been shown that automated bacterial analyzers are not always able to identify these species [4]. Detection of genetic material of non-pathogenic *Y. kristensenii*, *Y. frederiksenii*, *Y. intermedia*, *Y. bercovieri*, *Y. mollaretii*, *Y. rohdei* in biological samples from a sick person may indicate that the clinical manifestations of the disease infectious diseases can be caused by *Yersinia* species that were previously considered non-pathogenic [4,23].

Currently, the genus *Yersinia* has 28 species. Among the *Yersinia* that cause diseases in humans and animals, the following can be distinguished: *Yersinia pestis*, *Yersinia pseudotuberculosis*, *Yersinia enterocolitica* and *Yersinia enterocolitica*-like *Yersinia*. Each of these species has its own clinical and epidemiological significance. According to the International Classification of Diseases (ICD-10), plague has the code A-20 (some bacterial zoonoses), and in ICD-11 the code is 1B93. *Pseudotuberculosis* in ICD-10 has the code A28.8. (other specified bacterial zoonoses, not classified elsewhere). The *pseudotuberculosis* code in ICD-11 is 1B9Z. *Y. enterocolitica* causes the so-called intestinal yersiniosis. According to ICD-10, this disease has the following forms: enteritis caused by *Y. enterocolitica* (ICD-10 code: A04.6; ICD-11 correspondence code: 1A05) and extraintestinal yersiniosis (ICD-10 code: A28.2; ICD-11 correspondence code: 1B9A). *Y. enterocolitica*-like microbes are of particular interest to medical and veterinary services, since their role in the occurrence of human and animal infections requires further study and attention. It is possible that by the time ICD-12 is created, a new registration form will be introduced, for example, “yersiniosis caused by *Y. kristensenii* (*Y. frederiksenii*, *Y. intermedia*...)”.

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六分钟步行测试期间心电图监测的使用
**USE OF ELECTROCARDIOGRAPHIC MONITORING DURING
THE SIX-MINUTE WALK TEST**

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摘要: 在临床实践中, 运动测试用于确定个体康复方案、评估运动耐力、优化训练方案和评估疗效。当存在自行车测功测试 (BET) 禁忌症或无法进行该测试时, 可使用 6 分钟步行测试 (SMWT) 作为替代, 该测试可作为评估心血管和呼吸系统对身体活动功能反应的工具。在现代科学文献中, 尚无关于 SMWT 期间行进距离与 BET 期间获得的峰值代谢当量 (MET) 之间相关性的可靠信息, 这限制了直接比较这些测试数据以评估最大体能表现的可能性。本队列研究旨在探讨急性心肌梗死患者的 SMWT 与 BET 结果之间的相关性。本研究对 56 名患者进行了症状限制性 VEM 和 6 分钟步行测试 (SMWT), 以评估体能活动参数。此外, 还系统地评估了两项运动测试中检测到的心电图变化。研究结果表明, VEM 测试和心电图控制的 6 分钟步行测试 (SMWT) 中记录的最大心率 (HR) 平均值在统计学上没有差异。此外, SMWT 期间覆盖的距离 (以米为单位) 与 VEM 期间进行的负荷 (以代谢当量 (METS) 为单位) 之间存在显着相关性。这一观察结果表明, 这些参数可以互换作为评估身体活动耐受性的标准。结论。使用 6 分钟步行测试 (SMWT) 和自行车测功测试 (VEM) 为评估接受心脏康复计划的患者的心肺功能各个方面和身体健康水平提供了机会。需要进一步研究以探索在康复过程早期使用心电图控制的 TSH 的潜力, 以便为急性心肌梗死患者制定最有效和安全的体育训练。

关键词: 心脏康复、六分钟步行测试、自行车功率测试、心肌梗死。

Abstract. *In clinical practice, exercise tests are used to determine individual rehabilitation programs, assess exercise tolerance, optimize training regimens, and evaluate therapeutic efficacy. In the presence of contraindications to the bicycle ergometric test (BET) or when it is impossible to perform it, the 6-minute walk test (SMWT) is used as an alternative, which serves as a tool for assessing the functional response of the cardiovascular and respiratory systems to physical activity. In the modern scientific literature, there is no reliable information on the correlation between the distance covered during the SMWT and the peak metabolic equivalent (MET) obtained during the BET, which limits the possibilities of directly comparing the data from these tests to assess maximum physical performance. The purpose of this cohort study was to study the correlation between the SMWT and the BET results in patients who had suffered an acute myocardial infarction. In the study, 56 patients were subjected to symptom-limited VEM and 6-minute walk test (SMWT) to assess physical activity parameters. In addition, electrocardiographic changes detected during both exercise tests were systematically assessed. The results of the study showed that the mean values of maximum heart rate (HR) recorded during the VEM test and the ECG-controlled 6-minute walk test (SMWT) did not differ statistically. In addition, a significant correlation was found between the distance covered in meters during the SMWT and the load performed in metabolic equivalents (METS) during the VEM. This observation indicates the possible interchangeability of these parameters as criteria for assessing physical activity tolerance. Conclusions. The use of the 6-minute walk test (SMWT) and the bicycle ergometric test (VEM) provides the opportunity to assess various aspects of cardiorespiratory function and the level of physical fitness in patients undergoing a cardiac rehabilitation program. Further research is needed to explore the potential of using ECG-controlled TSH in the early stages of the rehabilitation process to develop the most effective and safe physical training for patients who have suffered an acute myocardial infarction.*

Keywords: *cardiac rehabilitation, six-minute walk test, bicycle ergometric test, myocardial infarction.*

Introduction

Modern advances in cardiac rehabilitation indicate a significant reduction in cardiovascular disease (CVD) mortality [1], as well as an increase in exercise tolerance and quality of life in patients [2]. Extensive research confirms the effectiveness of cardiac rehabilitation programs based on the use of dosed physical activity [3]. As part of the rehabilitation process, exercise tests are used to assess exercise tolerance, develop personalized programs, optimize the load and assess its clinical effectiveness [4].

The choice of a method for assessing physical activity tolerance depends on the clinical situation, equipment and personnel qualifications. The gold standard is the cardiopulmonary test with determination of $\dot{V}O_2\text{max}$ [5], but it is rarely used due to the need for complex and expensive equipment, as well as low tolerance in elderly and comorbid patients. Assessment of tolerance to physical activity is possible using a bicycle ergometer or treadmill test [6]. Review and recent studies [7,8] confirmed the high reliability of these tests in patients with cardiovascular diseases and in healthy people. The effectiveness of submaximal exercise tests (e.g., the modified Bruce test) for predicting peak $\dot{V}O_2$ compared to CPET in patients with coronary artery disease has also been studied [9]. However, these tests also have limitations. The study by Harb S.C. et al. [10] showed that the load on the treadmill is acceptable at a level of up to 7 METs, since many patients cannot cope with it above this level due to the excess of their daily activity. In the ORBITA study [11], the Bruce protocol treadmill test with electrocardiogram and $\dot{V}O_2$ analysis at submaximal load did not reveal significant abnormalities in patients undergoing PCI.

The 6-minute walk test (6MWT) is an accessible tool for assessing the response of the cardiovascular and respiratory systems to exercise [12]. It is well tolerated, does not require complex preparation or expensive equipment [13], and is a more natural activity, especially in the elderly and patients with musculoskeletal disorders. The 6MWT is suitable in the presence of contraindications to bicycle ergometry. There are no data in the literature on the relationship between the distance covered during the 6MWT and the peak MET assessed during the VEM. However, studies by Saba M.A. et al. [14] and Dourado V.Z. et al. [15] showed a strong positive correlation between the 6MWT results and peak MET or $\dot{V}O_2\text{max}$ ($r \approx 0.70$), confirming their relationship. The aim of the study was to determine the relationship between the 6MWT and the VEM results in patients after myocardial infarction.

Materials and methods.

A prospective cohort study conducted in the Ivanovo Cardiology Dispensary included 56 patients (79.4% men, 20.6% women) with acute MI undergoing the second stage of rehabilitation. Partial revascularization was achieved in 38 patients (67.9%), complete revascularization in 13 (23.2%), and no revascularization in 5 (8.9%). Admission was on the 14th–15th day after the disease. All patients underwent anamnesis collection, physical examination, body parameter measurement, heart rate and blood pressure monitoring, and assessment of concomitant diseases. Symptom-limited VEM and TSH were performed 24 hours before rehabilitation using the Accordix system for monitoring and data analysis. The distance traveled, load power (in METs), ECG changes, and heart rate were assessed. The RFC was determined according to the recommendations of the Russian Society of Car-

diologists [16]. Statistical analysis was performed using Statistica 12.0, including correlation analysis and χ^2 . Results and discussion. The examined patients: 79.4% were men, the average age was 58.8 ± 7.6 years. Social status showed that half were employed (50%), a third were pensioners (35.7%), and about 20% were unemployed; one patient had a disability of the 3rd group. According to the body mass index, 48.2% were overweight or pre-obese, 25% had grade 1 obesity, and a minority had more severe degrees of obesity. Normal body mass index was observed in 21.4%, and grade 2 and 3 obesity were observed in 3.6% and 1.8%, respectively. The distribution of the RFC in the VEM and TSH tests did not show statistically significant differences ($p > 0.05$). The average values of the maximum HR in the VEM and MWT tests differed significantly (95 [91–99] and 87 [83–90] bpm, $p < 0.05$). Individual comparison in each patient did not reveal significant differences between the HR values in both tests. When comparing the HR parameter as a percentage of the maximum in patients during the MWT and VEM tests, it was found that at 100% of the maximum HR in the MWT and VEM tests, there was no correlation ($p = 0.6$). Similarly, at 90% of the maximum HR in both tests, the correlation also did not reach statistical significance ($p = 0.37$). At the level of 80% and 70% of the maximum HR, there is no correlation between the HR during the TSH and the VEM test and is equal to $p = 0.13$ and $p = 0.13$, respectively. Correlation analysis revealed a strong reliable interdependence between the peak MET indicator during the VEM test and the distance covered during the MWT ($r = 0.63$, $p < 0.05$), which indicated the contingency of the results of these load tests (Fig. 3). Thus, it can be assumed that in the absence of VEM results, the maximum HR indicators obtained at the height of the load during the ECG-controlled MWT can be used to calculate the training heart rate. Correlation analysis showed a significant positive relationship between the peak MET during the VEM test and the distance covered during the TSH ($r = 0.63$, $p < 0.05$), which indicates the consistency of the results of these tests. Thus, in the absence of VEM data, the maximum heart rate obtained with ECG-controlled MWT can be used to determine the training pulse.

According to Ngai S.P.C. et al. [17], there is a strong positive correlation between the distance traveled during the TSS and the maximum power (in watts/kg) obtained in the cardiopulmonary test on a stationary bicycle ($r = 0.93$). A moderate relationship was also noted between HR max and systolic blood pressure during the TSS and treadmill test ($r = 0.67$ and $r = 0.57$). The average values of these parameters during the treadmill are slightly higher, which is associated with a higher intensity of the load. The work of González-Camarena R. et al. [18] showed that HR max during the TSS is about 86% of the HR achieved during the treadmill test, which indicates a load of medium and high intensity, especially in middle-aged and elderly patients. Gremeaux V. et al. [19] found that in patients with stable

coronary artery disease, the maximum HR during the TT is approximately 78% of the HR during the cardiopulmonary test.

The results of the present study showed that the distance covered during the TT and the power of the MET load during the VEM have a significant relationship, indicating their comparability as criteria for exercise tolerance. Although the TT and VEM are related, they assess different aspects of cardiorespiratory function: the TT mainly reflects functional activity, and the VEM - maximum cardiorespiratory capacity. In cardiac rehabilitation programs, exercise intensity is often determined by calculating the training range based on HRmax, which is determined from the VEM or TT results [20]. In the early stages of rehabilitation, especially when VEM is contraindicated in elderly and old patients, the TT is a preferred and safe tool for assessing the level of functional activity, confirmed by the correlation with the VEM results.

Conclusions. Thus, the MWT can be a useful supplement to the VEM in assessing the effectiveness of cardiac rehabilitation measures; however, it cannot completely replace bicycle ergometry. Both methods should be used to assess various aspects of cardiorespiratory function and physical fitness of patients within the framework of rehabilitation programs. Additional studies are needed to determine the possibility of using electrocardiographically controlled MWT with HRmax assessment in selecting a training pulse at the initial stages of rehabilitation of patients after myocardial infarction. Such studies will allow the development of the most effective and safe physical exercise regimens that take into account the individual characteristics of patients.

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儿童和成人神经退行性疾病发展过程中全身炎症过程的神经炎症成分
**NEUROINFLAMMATORY COMPONENT OF SYSTEMIC
INFLAMMATORY PROCESS IN THE DEVELOPMENT OF
NEURODEGENERATIVE CONDITIONS IN CHILDREN AND
ADULTS**

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摘要：神经退行性疾病是一种预后显著的状态性疾病，神经病学家和精神科医生都在积极研究。其疾病类型多种多样，包括退行性自闭症、痴呆症、多发性硬化症、帕金森病、阿尔茨海默病、进行性婴儿癫痫和儿童癫痫、全身性运动功能亢进症，以及许多其他状态性疾病，这些疾病的共同特征是进行性神经功能缺损、认知功能丧失以及出现非特异性脑刺激症状（癫痫发作、运动功能亢进症、肌张力障碍、刻板行为、精神病发作等）。尽管已开展了大量研究，但这些疾病的治疗仅限于暂时、不完全且依赖药物控制症状，因为这些疾病的病因机制仍未得到深入研究。神经免疫学领域的最新突破凸显了神经炎症在神经退行性疾病（其中一些本质上是自身免疫性疾病）的发生和发展中的重要作用。免疫张力指标已被引入临床实践，脑组织抗体滴度的检测也证实了这一点。大量科学论文特别关注神经退行性疾病患者免疫筛查中检测到的感染因子的研究，但这些数据分散且相互矛盾，因此被医学界忽视。本综述从抗原累积负荷、免疫潜能评估、体内平衡资源和代偿能力的角度，阐明了神经退行性疾病病因的现代视角，从而可以作为提出治疗这些难治性疾病新策略的起点。

关键词：神经炎症、神经再生、癫痫、微生物群、累积负荷。

Abstract. *Neurodegenerative processes are prognostically dramatic state conditions that are actively studied by both neurologists and psychiatrists. The nosologic forms are diverse and include regressive autism, dementias, multiple sclerosis, Parkinson's disease, Alzheimer's disease, progressive epilepsies of infancy and childhood epilepsies, generalized hyperkinesias, and a host of other state conditions that have in common progressive neurological deficits, loss of cognitive function, and the appearance of nonspecific symptoms of irritation to the of the brain (epileptic seizures, hyperkinesias, dystonic states, stereotypies, psychotic episodes and other). Despite many research studies being done, the treatment of these conditions is limited to temporary, incomplete and pharmacologically dependent symptom control, as the problem of the etiopathogenesis of these conditions still remains open. Recent advanced breakthroughs in neuroimmunology highlight the significant role of neuroinflammation in the initiation and development of neurodegenerative processes, some of which are autoimmune in nature. It is confirmed by the indicators of immune tension being introduced into clinical practice and the titers of antibodies to brain tissues being detected. A cascade of scientific papers has paid special attention to the study of infectious agents detected in immunological screening of patients with neurodegeneration, but these data are scattered and contradictory, and therefore are ignored by the medical community. The presented review figures out a modern vision of the neurodegenerative diseases etiopathogenesis from the point of view of the summative antigen load, assessment of the immunological potential, homeostatic resources and compensatory capabilities of the body, which as a result can become a starting point for proposing new therapeutic strategies for the treatment of these difficult-to-treat diseases.*

Keywords: *neuroinflammation, neuroregeneration, epilepsy, microbiota, summation load.*

The last decades have been marked by a significant increase in the incidence of neurodegenerative diseases. Thus, among the child population, there is a significant increase in the incidence of severe forms of childhood and infantile epilepsy, as well as regressive autism. A similar trend can be observed among adult patients with an increase in the incidence of multiple sclerosis, dementia, Parkinson's disease and Alzheimer's disease [1]. Despite the diversity of the clinical picture of various neurodegenerative diseases, several basic general patterns can still be identified. In most of the described clinical situations, one can find an indication of the presence in the anamnesis of immune or powerful emotional stress preceding the manifestation of the clinical picture. Cause-and-effect links are also indicated by increased psychoneurological symptoms after repeated similar impact, i.e. any infectious process or repeated emotional stress can only aggravate the progres-

sion of the disease. Thus symptomatic therapy in the groups of patients described turns out to be ineffective. In particular, progressive epilepsies of childhood and infancy are almost always resistant to antiepileptic therapy, and temporary relief of symptoms, as in multiple sclerosis, can sometimes be achieved by a course of corticosteroids. Children and adolescents with autism spectrum disorder are also characterized by the gradual development of pharmacoresistance, which leads to the acute need to increase the dosages of psychotropic drugs, polypharmacy and, as a consequence, a severe decrease in the tolerability of therapy and compliance with it.

The presence of the described common features in the course of diseases allows us to assume the uniformity of etiopathogenesis, which is confirmed by a number of studies [2, 3]. The most significant triggering mechanism for the development of neurodegeneration is the neuroinflammation process [4]. Neuroinflammation is a natural mechanism that underlies neuroplasticity and protection of nervous tissue from pathogenic agents or other damaging factors. Normally, neuroinflammatory and neuroregenerative processes are in balance and allow homeostasis to be maintained. However, in the presence of endogenous (e.g., hormonal deficiency, immunological compromise, genetic mutation, protein aggregation, or accumulation of metabolic by-products) or exogenous factors (e.g., infections, repeated trauma), a persistent inflammatory reaction is triggered [5, 6], involving both neurons and glial cells [7]. Glial cells do not transmit electrical impulses, due to which they have long been considered as supporting structures for neurons. However, scientific studies of recent decades have shown that glial cells significantly exceed neuronal cells in cellular and functional diversity. Thus, oligodendrocytes and microglia can regulate both the activity of neuronal tissue itself and the immune response that affects it. Traditionally, two types of action are distinguished - neurotoxic and neuroprotective ones. Microglia and astrocytes can produce proinflammatory or immunoregulatory mediators depending on the influence of endo- and exogenous factors. Chronic activation and formation of a reactive phenotype of glia in the process of neuroinflammation lead to the development of irreversible degenerative changes in neuronal tissue [8–10]. In addition, changes in the phenotypes of microglia and astrocytes, their loss of neuroprotective functions and acquisition of neurotoxic functions determine the stages, rate of progression and severity of neurodegeneration.

The simultaneity of the development of the clinical picture, changes in the immunological profile and the formation of reactive phenotypes of glial cells are confirmed by a number of pathomorphological studies [11], showing the dynamics of the loss of functional connections in neurodegeneration. Traditionally, the concept of an inflammatory process in the central nervous system is associated with clinically pronounced acute encephalitis, which is accompanied by a gross

neurological deficit, the presence of meningeal signs, a typical laboratory picture of acute inflammation in blood and cerebrospinal fluid tests. Neuroimaging often reveals changes in the form of focal damage and/or local or diffuse cerebral edema. Rapidly progressing neurological symptoms, developing against the background of a hyperthermic reaction and the accompanying typical laboratory picture, raise practically no doubts in terms of diagnostics. The development of a subacute and chronic inflammatory process is not accompanied by such a typical clinical and laboratory picture, as a result of which a long-term terminological confusion arises. Thus, sluggish progressive degenerative damage to the peripheral nervous system is traditionally designated by the term “polyneuropathy”, and the central nervous system - “encephalopathy” and “myelopathy”, which, unlike the terms “encephalitis”, “myelitis” and “polyneuritis”, does not seem to imply the primacy of the inflammatory process and leads the clinician away from the correct therapeutic strategy. A classic example is “epileptic encephalopathy”, the clinical manifestation of which is a dramatic course of polymorphic epileptic seizures, often with a status course, and a rapid loss of cognitive, motor and coordination skills, which is essentially a reflection of the progressive inflammatory process.

The clinical picture of subacute encephalitis and neurodegeneration in general can be delayed from the true onset of the disease for years, creating significant difficulties for early intervention. Thus, protein abnormalities that determine classical neurodegenerative diseases are detected long before the development of tangible neurological deficit [12, 13]. The time gap between immune compromise, the inflammatory process and the development of the clinical picture largely depends on the compensatory mechanisms of the human body, which ensure a long phase of relative subcompensation of the condition. Nevertheless, identification of the primary inflammatory process and its etiological picture is extremely important for timely and successful treatment. For a long time, the discussion of diagnostics and therapy of the primary inflammatory process was reduced just to the search for an isolated factor of infectious or non-infectious nature. A number of scientific papers [14-17] are devoted to the study of the influence of the viral load in general and specific viruses on the development of the neurodegenerative process. Special attention of scientists has always been drawn to the role of herpes viruses, which are chronic neurotropic viruses that penetrate and persist for a long time in the human host organism. In some situations, viruses can reactivate and cause damage to neuronal tissue after a long latent period. Viral reactivation occurs most often against the background of immunosuppression, although it can also occur in immunocompetent hosts. Several large epidemiological studies have examined whether these neurotropic viruses can play a role in the pathogenesis of neurodegenerative diseases, in particular, Parkinson’s disease and Alzheimer’s disease [16, 17]. The choice of these “candidate viruses” is due to the ability of

alpha-herpes viruses to manifest themselves in a latent state in the peripheral and central nervous system long before the manifestation of a neurological disease. No less interest was aroused by the potential viral genesis of various types of epilepsy and autism [14, 15]. The inconsistency of the obtained results and criticism of the studies were based on the fact of detection of a viral load in patients without a clinical picture and the identification of a category of patients with a developed clinical picture of neurodegeneration without a detected viral load.

Similar problems were encountered by studies focusing on the correlation between neurodegeneration and the presence of various bacteria in the body. A particular example of such a link are the PANS and PANDAS syndromes, the psychoneurological picture of which included hyperkinesia, tics, and mental retardation, caused by the effect of antistreptolysin-O (ASLO) due to cellular mimicry. Antibiotic therapy led to regression of the psychoneurologist symptomatology. In dementia, multiple sclerosis and autism, a frequent finding is the detection of positive results for antibodies to borrelia. The clinical picture of neuroborreliosis has no significant specificity and proceeds under the clinical mask of any of the neurodegenerative diseases [18]. Another example of an infectious agent leading to the development of neuroinflammation and neurodegeneration are clostridia, the significance of which has been actively studied in a number of large studies [19, 20]. The pathological influence of clostridial flora was considered from several sides: both due to the direct synthesis of neurotoxic substances, and as a factor influencing the metabolism of aromatic amino acids, precursors of neurotransmitters. In a study of patients with autism spectrum disorder [21], anticlostridial therapy led to a rapid reduction in the volume of undesirable behavior and stereotypes, and in a study of patients with multiple sclerosis [22], such therapy contributed to the stabilization of the neurological status. It should be noted that clostridial flora refers to the opportunistic form of bacteria, which is part of the normal flora of the human intestine and only some classes of clostridia are truly pathogenic. However, studies also consider a high titer of opportunistic clostridia as pathogenetically significant. Similar trends are characteristic of other types of opportunistic agents, not only other types of bacteria, but also opportunistic fungal-yeast flora [23]. Thus, chronic candidiasis leads to a significant change not only in the microbiotic portrait, but also in the composition of organic acids with a predominant accumulation of specific acids (tartaric acid, citric-malic acid, etc.) that have a neurotoxic effect. The up-to-date studies do not focus so much on typing an isolated dysbiotic factor, considering the microbiome and its biochemistry as an integral [22, 23] mechanism capable of both predisposing to the development of neurodegeneration and exerting neuroprotective properties, depending on its qualitative and quantitative composition, as well as the individual characteristics of the human body.

Research into the microbiome and its significance for the nervous system includes also the study of the simplest parasitic microorganisms (lamblia, toxoplasma, amoebas, and others) that cause protozoan infections. Clinically manifested protozoan diseases are usually developed among patients with severe immunodeficiency, but latent course is much more common. The theory of the importance of toxoplasma in the development of psychoneurological diseases has interested researchers for decades, but only recently a more or less structured study of the correlation of *T. gondii* infection and the risk of developing mental disorders was published [24]. Among the 80,000 Danish blood donors studied, the analyses of patients with an established diagnosis of schizophrenia (151 patients) were examined; the presence of *T.gondii* infection increased the probability of developing the disease by 47%. When examining other groups of patients, including those with a newly diagnosed mental illness, an increase in the probability of developing a more severe form of the disease with infection by 2.5 times was revealed, compared with the group of patients with negative laboratory tests. Despite this seemingly sensational correlation, a huge number of patients with schizophrenia are identified, including those with a severe progradient course with rapid increase in negative deficit symptoms without signs of toxoplasmosis. Similar results were obtained in a study of the immunopathogenesis of neurological manifestations of cerebral toxocariasis [25]. In general, the topic of intracellular and extracellular parasitoses occupies an important place in the formation of the systemic inflammatory process and neuroinflammation in particular. The most common examples of extracellular parasitoses are ascariasis and opisthorchiasis, which often proceed asymptotically or with predominant intestinal symptomatology. Nevertheless, the level of systemic inflammation and liver damage in helminthic invasions is high and can manifest itself in the form of skin rashes, dermatitis, obstructive syndrome, and, with increased permeability of the blood-brain barrier, psychoneurological symptoms [26-28]. In immunocompromised patients, helminthic invasion can provoke a level of systemic inflammation sufficient to develop both neuro-intoxication syndrome and clinically advanced eosinophilic meningoencephalitis and parasitic cysts in the brain, leading to the development of focal neurological symptoms [29].

Nevertheless, the consideration of any monoetiological antigen-induced neurodegenerative process seems incorrect. All the described cases of neurodegeneration against the background of antigen load can be united by the fact of the initial and an increasing immunodeficiency state with a progressive imbalance in the functioning of the immune system and a tendency to form an autoimmune component. Thus, in our clinical practice, we most often encounter a polycasual antigen load, in the structure of which each individual component is insufficient for the development of psychoneurological symptoms. The summative antigen

load, which includes viral, bacterial, fungal-yeast, and often parasitic, becomes a significant factor for the development of a pronounced systemic inflammatory process, progressive disruption of the blood-brain barrier, and, as a consequence, damage to the structures of the neurovascular unit. The lack of severity of the inflammatory process against the background of the initial immunodeficiency status leads to an erased clinical picture of neuroinflammation and gradually developing neurological symptoms. Detection of high titers of opportunistic flora and, in particular, parasitosis should be considered as a clear sign of immunodeficiency status and depletion of summative compensatory capabilities, which are key in the question of the prospects for the development of neurodegeneration.

Laboratory verification of the disorders under discussion is carried out by us using a clinical and laboratory block of studies, including classical neurospecific indicators, indicators of the systemic inflammatory process (neurospecific enolase, s100 protein, TNF alpha, screening of pro- and anti-inflammatory cytokines, immunoblot of antinuclear and antineuronal antibodies and others), however, recently, integral studies characterizing the summative antigen load and compensatory potential have come to the forefront in laboratory diagnostics. The most practically applicable of such studies is the integral laboratory panel, which for examples includes a study of leukocyte elastase - as a total indicator of damage to the blood-brain barrier due to an increase in its permeability, α 1-proteinase inhibitor (α 1-PI) - as an integral indicator of compensatory antiproteolytic capabilities of serum and key antineuronal antibodies (antibodies to the basic myelin protein and s100 protein). The use of integral indicators allows a practicing specialist to immediately figure out a therapeutic strategy that includes both complex antigen unloading and consistent restorative work on the compensatory potential. Against the background of complex therapy, the indicators of the “Neuro-test” panel allow us to objectify the dynamics of the reduction of systemic inflammation, neuroinflammation and autoimmune damage to neuronal tissues in all types of neurodegenerative diseases. This integrated panel is of particular importance in diagnostics and assessment of the dynamics of treatment in patients over ten years old, when standard indicators of neuroinflammation become less demonstrative due to the formation of the blood-brain barrier. It should be noted that the absence of reliable laboratory indicators of neuroinflammation for a long time allowed this mechanism to be ignored in the etiopathogenesis of neurodegeneration; the emergence of the possibility of accessible and evidence-based verification of the neuroinflammatory process with the determination of its quantitative characteristics opens up significant prospects in the development of new therapeutic strategies for the treatment of difficult-to-treat diseases and argues for the primary importance of the anti-inflammatory direction in the treatment of neurodegenerative diseases among children and adults.

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早产儿听力筛查对早期诊断听力障碍的潜力调查

**INVESTIGATION OF THE POTENTIAL OF AUDIOLOGICAL
SCREENING IN PRETERM INFANTS FOR EARLY DIAGNOSIS OF
HEARING IMPAIRMENT**

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摘要。本文分析了导致早产儿听力损失的危险因素。已确定该群体听力损失发生率的增加与多种危险因素有关,由于重症监护病房的治疗,出生后这些危险因素的数量会增加。研究目的:确定影响早产儿听力损失发展的危险因素。该研究纳入了42名早产儿。其中18名接受了普遍听力筛查,24名被发现患有听力损失。使用原始问卷收集数据,并进行了临床和实验室检查。研究表明,被检测到听力障碍的早产儿具有以下特点:妊娠期较短,出生体重较低,并且更容易出现宫内缺氧、分娩窒息和胎儿感染的迹象。出生后,这些患者更常接受人工肺通气(ALV)手术和抗生素治疗。早产儿存在听力损失的伴随风险因素,这会导致听力病理性改变的早期表现。然而,需要注意的是,在其他患者中,这些表现可能不那么明显,并且在较晚

的年龄出现,因此需要密切监测。结论:为了提高早产儿听力障碍的诊断效率,有必要改进此类患者的诊疗流程,并引入长期听力监测。这将使我们能够及时发现和纠正听力障碍,改善他们的生活质量,并预防未来听力障碍的发生。

关键词: 早产儿, 听力筛查, 儿童期听力损失, 听力监测。

Abstract. *This article analyzes the risk factors that contribute to hearing loss in premature infants. It has been established that the increased frequency of hearing loss in this group is associated with a combination of risk factors, the number of which increases in the postnatal period as a result of therapy in the intensive care unit. Objective of the study: to determine the risk factors in premature infants that affect the development of hearing loss. The study included 42 premature infants. Of these, 18 underwent universal audiological screening, and 24 were found to have hearing loss. An original questionnaire was used to collect data, clinical and laboratory examinations were conducted. The study showed that premature infants with detected hearing impairments have the following features: shorter gestation period and lower birth weight, and more often have signs of intrauterine hypoxia, asphyxia during childbirth and fetal infection. After birth, these patients more often underwent artificial lung ventilation (ALV) procedures and antibiotic therapy. The presence of concomitant risk factors for the development of hearing loss in premature infants contributes to an earlier manifestation of pathological changes in hearing. However, it should be taken into account that in other patients these manifestations may be less pronounced and appear at a later age, which requires careful monitoring. Conclusions: to improve the efficiency of diagnosing hearing impairments in premature infants, it is necessary to revise the routing of such patients and introduce long-term audiometric monitoring. This will allow for timely detection and correction of hearing impairments, improving their quality of life and preventing the development of pathology in the future.*

Keywords: *premature infants, audiological screening, childhood hearing loss, audiometric monitoring.*

Relevance. Today, there are about 13 million people with hearing impairments registered in the Russian Federation, of which 1.3 million are children and adolescents. Permanent bilateral sensorineural hearing loss is diagnosed in 1-3 newborns per 1000 physiological births, while in the risk group this figure increases 50 times. Studies show that 2-4% of newborns requiring intensive care have significant hearing impairments or deafness. Early detection and timely intervention are key factors for successful rehabilitation. WHO recommends programs for the prevention of childhood hearing loss, since early detection can prevent up to 60% of cases of hearing impairment in children. The introduction of universal audiological screening reduces the age of diagnosis and the start of hearing aids, which increases the effectiveness of auditory-speech rehabilitation. Additionally, in the

first year of life, children may develop risk factors such as mechanical ventilation, surfactant and CPAP therapy, ototoxic medications, hyperbilirubinemia, and others. These conditions may lead to undetected and progressive hearing loss, negatively affecting the development and social adaptation of the child. Repeated audiological screening is recommended in newborns rehospitalized in the first month of life in the presence of risk factors such as hyperbilirubinemia, meningitis, or pneumonia. Premature infants with a gestational age of less than 33 weeks are especially at risk, as they may have sensory-neural hearing loss due to treatment in intensive care units. The aim of the study was to evaluate the influence of pre-, intra-, and postnatal risk factors on the development of hearing impairment in premature infants.

Materials and methods. In the framework of a single-center prospective cohort study, 42 premature newborns (median gestational age 33 [31.4; 36] weeks) were examined, admitted to the Department of Neonatal Pathology of the Ivanovo Regional Children's Clinical Hospital from May to December 2023. Data collection included anamnesis, clinical and laboratory methods, as well as identification of risk factors for hearing loss using a developed questionnaire. Primary audiological screening was carried out by recording evoked otoacoustic emission (OAE) using the aScreen device (Neurosoft LLC, Ivanovo). Patients were divided into two groups: 1) with a negative OAE result ($n=24$), 2) with a positive result ($n=18$). Statistical processing was performed in Statistica 12.0; qualitative data are presented in absolute and relative values, significance was assessed using the χ^2 criterion, quantitative indicators - median and interquartile range. Significance was accepted at $p < 0.05$.

Research results.

In the group with hearing impairments, girls predominated (58.3%, $n = 14$), while in the group with a positive audiological screening, their share was 33.3% ($n = 6$). The groups also differed in gestational age (Group 1 - 31.4 [29.4; 33.2] weeks, Group 2 - 34.2 [32.5; 35.8] weeks), birth weight (1645 [1481.25; 2410] g and 2135 [1869.75; 2545] g, respectively) and pregnancy ordinal number (4 [2; 6] and 2 [1.25; 2.75]). The analysis of the questionnaire revealed a significant role of prenatal risk factors in patients with hearing impairments: complicated obstetric and gynecological history of the mother, factors contributing to intrauterine hypoxia (placental insufficiency, anemia, preeclampsia), intrauterine growth retardation syndrome, as well as signs of intrauterine infection (prolonged anhydrous period, change in the color of the amniotic fluid, intrauterine infections). The study compared two groups: the first ($n = 24$) and the second ($n = 18$). The complicated obstetric and gynecological history of the mother was approximately equally common in both groups - 87.5% and 88.9%, respectively. Placental insufficiency was noticeably more common in the first group (58.3% versus 27.7%),

while anemia in the mother was more common in the second group (55.6% versus 33.3%). The frequency of gestosis was similar (about 12%). Intrauterine growth retardation syndrome was more often observed in the first group (41.6% versus 22.2%), and prolonged anhydrous interval — in the second (50% versus 25%). Changed color and odor of amniotic fluid were more often recorded in the first group (41.6% versus 16.6%). The presence of intrauterine infections was approximately the same. Low Apgar score (less than 7) was significantly more common in the first group (87.5% versus 55.6%). Thus, the first group is characterized by more pronounced pregnancy complications and worse neonatal indicators, while anemia and prolonged anhydrous interval were more often observed in the second group. Burdened obstetric and gynecological history in the mother, preeclampsia and intrauterine infections were found with the same frequency in both groups. Children who did not undergo audiological screening were more likely to have placental insufficiency, intrauterine growth retardation syndrome, and altered color and odor of amniotic fluid. In the group with normal hearing, maternal anemia and a prolonged anhydrous period during labor were more often detected.

Postnatal risk factors: intubation ventilation in the first days of life was significantly more frequent in children with hearing impairment (58.3% vs. 27.7%, $p < 0.05$), while the frequency of CPAP use was similar. Antibiotic therapy was administered to all patients with hearing loss and to most with normal hearing (61.1%). Increased total bilirubin was significantly more frequent in children with normal hearing (33.3% vs. 61.1%, $p < 0.05$). Among 24 patients, unilateral hearing impairment was detected in 6 newborns (25%). In this group, the most common recorded conditions were antibiotic use, intrauterine growth retardation syndrome, and complicated maternal obstetric and gynecological history. CPAP was used in 2 patients, and total bilirubin increased in 1 patient. The median of the total number of risk factors was: 8.5 [7; 10] for bilateral hearing loss; 7.5 [7.25; 10] for unilateral hearing loss; 6 [4; 9.5] in children with normal hearing.

Discussion. The health of an infant and preschool child is largely determined by maternal risk factors, including age, health status, pregnancy course, pregnancy and delivery sequence, and exposure to occupational hazards. Intrauterine cytomegalovirus infection is one of the known causes of congenital hearing loss [8]. Thus, timely detection of perinatal risk factors before delivery is necessary for the prevention of hearing loss and other perinatal pathologies. The results of the study confirm the significant influence of the mother's health, pregnancy course, and abortions on the development of hearing pathology in the child. Hearing loss in premature infants is caused by a complex of factors based on the immaturity of organs and sensory systems, including the auditory analyzer, which creates the basis for the synergistic effect of many perinatal and postnatal risks [9]. After universal audiological screening, newborns may be exposed to additional risk

factors that increase perinatal pathology. Thus, long-term (more than 5 days) or dose-dependent use of ototoxic antibiotics, especially aminoglycosides, increases the risk of hearing impairment by 10 times compared to full-term infants without complications [10]. Aminoglycosides, often used in combination with β -lactams in intensive care units, cause damage to the hair cells of the cochlea and vestibular apparatus, which leads to irreversible hearing loss. Damage begins with high-frequency hearing and progresses to lower frequencies [11]. Ototoxicity depends on the duration of therapy, the concentration of the drug in the blood, concomitant diseases and the simultaneous use of loop diuretics and vancomycin. An additional factor is the constant background noise of modern resuscitation equipment, which contributes to the development of hearing impairment [9]. In our study, children with hearing impairment were more often subjected to mechanical ventilation and received high doses of antibiotics. Hyperbilirubinemia, which can selectively damage the auditory nuclei of the brainstem and the auditory nerve, did not have a significant effect on hearing in our study, probably due to the timely initiation of phototherapy. Other studies note the role of hyperbilirubinemia in combination with additional factors such as birth weight, duration of hyperbilirubinemia and acidosis in the development of hearing loss in premature infants [12]. Hypoxia, especially severe birth asphyxia, is an independent risk factor for hearing impairment, causing irreversible damage to the outer hair cells and the vascular stria of the cochlea [9, 13]. This explains the association found between intrauterine growth retardation, low birth weight, low Apgar scores, and mechanical ventilation with the risk of hearing loss in our study. The study by Greczka et al. showed that children who received intensive care in the neonatal period may develop hearing impairment at the age of 2–4 years, probably due to demyelination or degeneration of the auditory pathway [14]. In our study, long-term hearing monitoring was not performed, which may explain the underestimation of the prevalence of pathology in premature infants.

Conclusions. Premature infants have multiple risk factors that contribute to the development of hearing loss. The key ones are intrauterine and intranatal hypoxia, low Apgar score, low birth weight, use of ototoxic antibiotics, and artificial ventilation. These factors are equally common in both unilateral and bilateral hearing loss. The total number of risk factors is significantly higher in premature infants who have not undergone audiological screening, but children with normal hearing also have the influence of risks, which does not exclude the possible development of hearing impairment in the future. The risk of hearing loss in premature infants significantly exceeds that in full-term infants. Long-term and comprehensive audiological monitoring of premature infants is critical. Early diagnosis of the topic of hearing loss and timely rehabilitation are necessary for optimal formation of speech function and prevention of deaf-muteness. Given the

morphofunctional immaturity, monitoring should include dynamic examination by otolaryngologists-audiologists and other specialists during the first three years of life. To improve the efficiency of identifying and managing such patients, it is necessary to adjust the standard routes of monitoring premature babies, tested at the regional level. It is necessary to develop methodological recommendations defining the concept of audiological monitoring, the timing, stages and types of studies, as well as the places where they are carried out. It is important to coordinate the work of district pediatricians, otolaryngologists-audiologists, neurologists and speech therapists to solve this problem.

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农业适宜性评价方法研究现状
**CURRENT STATUS OF RESEARCH ON AGRICULTURAL
SUITABILITY EVALUATION METHODS**

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摘要。农业适宜性评价是土地资源科学利用的核心问题，旨在通过多维指标体系评估土地支持农业生产的能力。本文系统梳理了国内外农业适宜性评价研究进展，对比了地理信息系统 (GIS) 评价方法、机器学习、层次分析法 (AHP) 及逻辑回归分析等主流方法。研究发现，现有研究在权重分配和动态模拟方面仍存在不足。未来需基于精准土地评估的需求，加强跨学科融合，动态构建指标体系，为区域农业布局优化提供科学依据。

关键词：农业，适宜性评估，层次分析法，地理信息系统

Abstract. *Agricultural suitability assessment is a core issue in the scientific utilization of land resources, aiming to evaluate the capacity of land to support agricultural production through multi-dimensional indicators. This paper systematically reviews the research progress on agricultural suitability assessment both domestically and internationally, comparing mainstream methods such as geographic information system-based evaluation methods, machine learning, analytic hierarchy process, and logistic regression analysis. The study found that existing research still has shortcomings in weight allocation and dynamic simulation. In the future, it is necessary to strengthen interdisciplinary integration based on the demand for precise land assessment, dynamically construct an indicator system, and provide scientific basis for the optimisation of regional agricultural layout.*

Keywords: *Agriculture, Suitability Assessment, Analytic Hierarchy Process, Geographic Information System.*

Introduction

Land, as the cornerstone of human survival and development, supports the basic needs of human clothing, food, housing, and transportation(Ongley, Xiaolan, and Tao 2010). It is an indispensable pillar for all industries of the national economy and serves as the core link in human production relations(Arnold et al. 2014). The rational planning and utilisation of land resources are key to achieving sustainable use of land resources and sustainable development of human society(Sattler et al. 2010). It not only optimises the allocation of land resources, enhances land utilisation efficiency, and promotes economic prosperity but also effectively protects the ecological environment, prevents resource waste and destruction, and maintains ecological balance(Romeijn et al. 2016). From an economic perspective, scientific land planning can rationally allocate resources, optimise industrial layout, attract investment and development, and inject strong momentum into economic growth; from an environmental perspective, it emphasises ecological protection and restoration, promotes green development, and creates a more livable environment for humanity; from a social perspective, land planning concerns public interest and residents' quality of life, and is an important means of achieving social fairness and enhancing public welfare(Negasa and Wakjira 2021). Therefore, land and its rational planning are of immeasurable importance to the long-term development of human society.

Agricultural suitability assessment is a critical process that evaluates the potential of land for agricultural production(Myagmartseren and Myagmarjav 2018). This assessment involves analyzing various factors, including soil characteristics, climate conditions, topography, and water availability, to determine the most suitable crops for a given area(Lee et al. 2023). The primary goal of agricultural suitability assessment is to optimize land use for food production while ensuring sustainability(Johnson, Cramb, and McAlpine 1994). As the global population continues to grow, the demand for food increases, necessitating the efficient use of available land resources. By identifying suitable areas for specific crops, land managers can make informed decisions that enhance agricultural productivity and sustainability.

Assessment Methods

Various methods have been employed in agricultural suitability assessments, each with its strengths and limitations. Traditional methods often rely on expert judgment and qualitative assessments, which can be subjective. However, advancements in technology have led to the development of more objective and data-driven approaches. Currently, the mainstream methods mainly include the Delphi method, the Analytic Hierarchy Process (AHP), GIS spatial analysis, Logistic regression model analysis and Multi-Criteria Decision Analysis (MCDA),

etc(Aldababseh et al. 2018; Bagheri et al. 2021; BASNET, APAN, and RAINE 2001; Myagmartseren and Myagmarjav 2018).

The Delphi method

The Delphi method is also known as the expert scoring method. The Delphi method is a questionnaire-based research method that collects information by soliciting advice from experts in relevant fields and gradually organises and refines this feedback(Moshia et al. 2009). This process allows the experts' views to gradually converge, with researchers ultimately integrating all expert opinions to form research findings. During this process, the average value gradually approaches the final research evaluation result. However, because it relies on experts' professional knowledge, it has a certain degree of subjectivity(Ongley, Xiaolan, and Tao 2010).

Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP) is a simple decision-making method proposed by Professor Ladislaus R. Saaty, an operations researcher at the University of Pittsburgh, in the 1970s(Bagheri et al. 2021). It is designed to address complex and ambiguous problems, particularly those that are difficult to analyse quantitatively. The core idea of this method is to systematically analyse the target problem(Hamzaoui, Baghdadi, and Hilali 2021). It breaks down decision-making factors into multiple levels, including the objective level, criterion level, indicator level, and alternative level. It establishes a hierarchical analysis structure model and, through quantitative and qualitative analysis and judgement, ultimately achieves a method for planning and decision-making. This method has the characteristics of logic, system, simplicity, and practicality(Romeijn et al. 2016).

Geographic Information Systems (GIS)

GIS has become a fundamental tool in agricultural suitability assessments. It allows for the integration of spatial data, enabling the analysis of various factors that influence land suitability. It is a spatial data analysis technique based on the location and morphological characteristics of geographical objects, with the aim of extracting and transmitting spatial information(BASNET, APAN, and RAINE 2001). The main tools include overlay analysis, interpolation analysis, and principal component analysis (PCA). Overlay analysis in geographic information systems involves combining data layers composed of relevant thematic layers to generate a new data layer, with the results integrating the attributes of the original two or more layers(Myagmartseren and Myagmarjav 2018). Overlay analysis not only involves comparisons of spatial relationships but also comparisons of attribute relationships(Myagmartseren and Myagmarjav 2018). It can predict pixel values in a grid based on limited sample data points and can perform overall predictions for the study area using point data interpolation, ultimately outputting grid data results(Ongley, Xiaolan, and Tao 2010). Interpolation methods can predict pix-

el values in a grid based on a limited number of sample data points. They can perform overall predictions for the study area using point data interpolation and finally output grid data results(Lambin et al. 1993). Principal component analysis is a statistical procedure used to transform data within input bands in a multi-attribute space into a new multi-attribute space rotated relative to the original space axes, thereby extracting the most important features of the dataset(Maheswaran et al. 2022).

Logistic regression model analysis

Logistic regression analysis is a generalised linear regression model used to study the relationship between categorical dependent variables and independent variables(Ongley, Xiaolan, and Tao 2010). Depending on the type of dependent variable, logistic regression analysis can be categorised into binary logistic regression, multinomial logistic regression, and ordered logistic regression(Tang et al., 2020). In practice, the most commonly used type is binary logistic regression. Binary logistic regression predicts the probability of the relationship between a categorical variable and multiple factors, fully considering the influence of natural, social, and economic factors(Liu et al., 2009). It not only enables fitting analysis of multiple factors but also achieves simulation and prediction of various land use types(Tang et al., 2020). It is primarily used to predict the probability of events occurring under the influence of multiple factors, representing an extension of the ordinary multiple linear regression model(Lin et al., 2017). As a non-linear model, it effectively addresses the issue of the dependent variable being a categorical variable rather than a continuous variable.

The multi-criteria decision analysis (MCDA)

Multi-criteria decision analysis is a decision-making methodology that considers multiple criteria to evaluate a range of decision options(Aldababseh et al. 2018). By constructing formal models of decision-makers' preferences, value trade-offs, and objectives, it enables the systematic and transparent comparison of alternative policies or actions under consideration(Ennaji et al. 2018). This approach integrates criteria of different natures and dimensions for analysis, serving as a method to assist decision-makers in balancing and selecting among multiple criteria or objectives(Ongley, Xiaolan, and Tao 2010). This method is particularly suitable for complex decision-making scenarios involving multiple objectives, criteria, or attributes.

Case Studies

Numerous case studies illustrate the practical applications of agricultural suitability assessments across different regions and contexts. For instance, (Abdelfattah, 2013) exemplifies an integrated land use planning approach in Abu Dhabi, utilizing GIS to overlay groundwater salinity maps with land suitability maps, focusing on soil resources, relief, and water availability to identify potential expansion

zones. Similarly, (Fadl et. al., 2020) employed remote sensing and GIS techniques to evaluate land capability and suitability in El-Qusiya, Egypt, highlighting the importance of soil, vegetation, and climate data in land assessment for sustainable agriculture. (Wang et al., 1994) discusses the use of artificial neural networks within GIS to improve the accuracy of land-suitability assessments by addressing the limitations of traditional methods. This integration facilitates the handling of large datasets and complex decision-making criteria. Geostatistical methods have also been utilized to produce detailed spatial maps of soil parameters, as demonstrated by (Aldabaa et. al., 2020), who applied ordinary kriging within a GIS framework to assess desert soils in Egypt, considering variables such as soil texture, pH, and EC. This approach facilitates precise spatial analysis crucial for determining land suitability for specific crops. (Kidd et. al., 2015) advanced digital soil assessment by generating high-resolution 3D soil attribute grids and climate indices, such as chill-hours and frost risk, to support agricultural versatility and productivity evaluations. The integration of diverse datasets through multi-criteria decision analysis (MCDA) has been a common theme, as seen in (Ozsahin et. al., 2021), who combined various spatial datasets within a GIS model to evaluate agricultural productivity in Tekirdağ, Turkey. This approach allows for dynamic and precise identification of suitable agricultural zones. Similarly, (Xu et. al., 2023) employed the analytic hierarchy process (AHP) within GIS to assess land suitability in Taiyuan, China, incorporating topography, soil, water sources, and social factors, while accounting for urban and natural protected areas to ensure ecological conservation.

Machine learning models have been increasingly adopted for land suitability assessments, with (Taghizadeh-Mehrjardi et. al., 2020) exploring their application to enhance the accuracy and sustainability of agricultural production evaluations. In parallel, (Mostafiz et. al., 2021) developed a land suitability system based on satellite-derived soil-vegetation indices, integrating multiple criteria through GIS-based multicriteria decision analysis, including elevation, slope, and vegetation indices, to refine suitability mapping. Recent studies have also focused on ecological and environmental considerations in suitability assessments. (Jokar et. al., 2023) proposed a new spatial model based on Iranian ecological and FAO models, utilizing geometric mean evaluation and calibration methods to improve the management of irrigated lands. Their findings underscore the importance of ecological factors in land suitability evaluations.

Similarly, (Thanh et. al., 2020) applied land suitability classification to orient agricultural land use in Vietnam, proposing specific land management strategies based on suitability levels (S1 to N). Their work emphasizes the importance of classifying land to guide effective utilization and conversion strategies for crops and livestock. In the realm of spatial decision-making, (Bagheri et. al., 2021) in-

egrated Delphi and Analytical Hierarchy Process (AHP) methods with GIS to assess coastal land suitability in Malaysia. This hybrid approach demonstrates the practical application of multi-criteria decision analysis in land-use planning, facilitating informed policymaking.

Overall, the current research status reflects a multidisciplinary approach combining remote sensing, geospatial analysis, multi-criteria evaluation, environmental impact assessment, and modeling techniques. These efforts aim to enhance the precision, sustainability, and policy relevance of agricultural suitability assessments across diverse environments and scales.

Conclusion

Agricultural suitability assessment is a critical process for achieving sustainable development in the context of sustained global economic growth. By integrating advanced technologies such as GIS, fuzzy logic, and machine learning, more accurate and efficient assessment methods can be provided for suitability assessment in land classification. Although progress has been made in agricultural suitability assessment methods, several challenges remain. The source and quality of data, as well as the selection of assessment indicators, are crucial to the accuracy of the assessment. Additionally, integrating multiple data sources, fostering interdisciplinary collaboration, and validating models are essential for improving assessment outcomes. Future research should focus on enhancing the relevance and practicality of suitability assessments in specific contexts and developing more robust models.

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